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Information for Subscribers

A CHANGE IN THE PUBLICATION SCHEDULE

On account of war and post-war conditions, it has not been possible to bring the publication of Botanical Abstracts into conformity with the monthly schedule originally planned.

For this and other reasons, it has been decided to omit the four months, June to September, 1919, inclusive. The October issue therefore appears as Volume II, No. 4. Your files will show the issue of May, 1919, to have appeared as Volume II, No. 3. The pagination of the October issue, Vol. II, No. 4, is in continuation of the pagination of the May issue, Vol. II, No. 3.

VOLUMES III AND IV

The above change in the publication schedule will make the issue of Volume III, No. 1, begin with January, 1920. Volumes III and IV will consist of six numbers to each volume and the two volumes will be completed in the year 1920. It is believed that this arrangement will prove more satisfactory to the subscribers.

NOTE

Some changes in the subdivision of the field, and corresponding changes in editors and sections, have been made, but will not apply until later.

Some improvements in the style of Botanical Abstracts are being made from time to time as the issues appear. The Editorial Board will be glad to receive suggestions as to possible improvements and such suggestions may be addressed to the Editor-in-Chief or to any Editor.

THE PUBLISHERS.

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No. 4

Note:—The four months, June to September, are omitted. Vol. II ends with no. 6, December.

ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, Editor

640. BERGMAN, H. F. A report on the plant survey of Barnes county, North Dakota. Bienn. Rept. Dir. Agric. Coll. Surv. North Dakota (1911-1912) 6: 121-150. 1918.—Work was begun on the survey in 1905 and continued presumably during the summer months until 1911. The country varies from flat to undulating prairie. Woodland is confined to narrow strips along the banks of streams. Marsh lands also occur, but prairie land is the most extensive and characteristic of this country, although grama (*Bouteloua*) is the most abundant grass. *Andropogon* and *Bouteloua* are predominant in the moist valleys while on the uplands *Stipa* and *Bouteloua* are predominant. The true Buffalo grass (*Bulbilia*) forms occasional patches. This publication also contains lists of the more important species and a catalogue of plants. —H. L. Shantz.

641. BERGMAN, H. F. Flora of North Dakota. Bienn. Rept. Dir. Agric. Coll. Surv. North Dakota (1911-1912) 6: 151-372. 1918.—In the introduction to the flora an account is given of the early exploration, of the later collections and a description of the physiography of the state. The vegetation shows little diversity. Timbered areas are limited largely to stream banks and to the Turtle mountains and consist largely of elm, ash, box-elder, oak and hackberry; the prairie is divided into *Bouteloua-Bulbilia*, or short grass prairie and *Andropogon* prairie. The latter is limited in the east by high soil water content and is replaced in the west on the drier soils by the short grasses. In the southwest yellow pine and juniper occur in the badlands. A discussion is given of the vegetation of alkali lands, wet meadows, river banks and of the weeds of cultivated fields.—H. L. Shantz.

642. CANNON, W. A. The evaluation of the soil temperature factor in root growth. Plant World 21: 64-67. Mar., 1918.—It is shown that the product formed by the rate of root growth at a given temperature (R) and the duration of this temperature (T) is a datum of ecological importance in investigating distributional controls. The product TR has been determined for *Covillea* for Tucson, Arizona, and Carmel, California, on the basis of growth measurements of roots under controlled conditions, and of detailed inspection of soil thermograph records. The expected root growths under natural conditions at Tucson and Carmel are respectively 74 mm. and 588 mm. This plant is characteristic at Tucson and can not be made to grow at Carmel.—Forrest Shreve.

643. COLLINS, MARGORIE ISABEL. On the leaf anatomy of *Scaevola crassifolia*, with special reference to the epidermal secretion. Proc. Linn. Soc. New South Wales, 42: 247-259.

6 fig. 2 pl. Sept., 1918.—A morphological study of the leaf structures of *Scacrola crassifolia*, a xerophytic sand-dune plant of the Goodeniaceae growing near Adelaide. All stages are included in the investigation from the earliest formative structures to the mature leaves. Closely set, peltate, glandular hairs covering the surface of the rudimentary leaves secrete a sticky substance that completely coats over the entire growing point. These glands suspend their activity as the leaf matures and the secretion dries, giving the leaf a lacquered appearance. Where the leaf base attaches to the stem the glands remain active so that the axil of the leaf is filled with the secretion which serves to protect the young bud. At a later stage the leaf becomes succulent and this dried secretion falls off. Stomata are seen in all stages of their development but they are functionless at first owing to the plugging of their pores with the secretion. With the cessation of glandular activity the stomata reach their full development and become functional. Differentiation of leaf tissues is likewise belated, beginning first with the decreased activity of the glands. The mature leaf is thick and succulent due to the development of water storage tissue. No spongy mesophyll is formed, the bulk of the leaf consisting of a number of rows of palisade cells. Mucilage cells and water storage tracheids are derived from this central tissue.—P. D. Strausbaugh.

644. FOCKE, W. O. Die nordwestdeutsche Küstenflora. [The coastal flora of northwest Germany.] *Flora* 111-112: 282-293. 1918. Discussing the general features of the vegetation, the author states that the bog formation occurs in one station only. Forest is absent but some herbaceous members of the forest flora occur, possibly favored by the high humidity. A few calciphile species occur on shell-beds, while calciphobes are rare and of recent introduction. The drying effect of the wind is of little importance and most injury by the wind is due to the salt spray which it carries inland. Occasionally all the planted trees in a locality die simultaneously without visible external injury, and this the author believes is due to subterranean salt water. Certain non-halophytic plants limited to the seashore are probably favored by special climatic conditions of humidity and temperature.—H. A. Gleason.

645. FOLSOM, DONALD. The influence of certain environmental conditions, especially water supply, upon form and structure in *Ranunculus*. *Physiol. Res.* 2: 209-276. 24 fig. Dec., 1918. The aim of this work in the words of the author is "to determine quantitatively the responses produced in the development of two plastic species (*Ranunculus sceleratus* and *R. abortivus*) with regard to certain differences in the surroundings, especially in soil-moisture content, and to determine as far as possible any correlations that may be manifest between structural differences occurring in various parts of the plant, on the one hand, and the environmental conditions, on the other." [See Bot. Absts. 2, Entry 307.]—P. D. Strausbaugh.

646. GAIL, FLOYD W. Some experiments with *Fucus* to determine the factors controlling its vertical distribution. *Publ. Puget Sound Biol. Sta.* 2: 139-151. 1 chart, 6 tables. Dec., 1918.—Light is found to be the controlling factor in determining the lower limit of *Fucus*. With the reduction of light intensity sporelings can not survive when planted more than 3 dm. below the surface, and well grown plants at a depth of 1 m. undergo decomposition and death. Gravelly beaches are without *Fucus* because of the movement of the stones, and the smoothness of the latter permits of rapid and thorough drying during low tide thus preventing germination.—P. D. Strausbaugh.

647. GRIGGS, ROBERT F. The recovery of vegetation at Kodiak. *Ohio Jour. Sci.* 19: 1-57. 32 fig. Nov., 1918.—The first of a series of papers setting forth the results of the Katmai Expeditions of the National Geographic Society. The eruption of Katmai in 1912 spread an ash blanket a foot in depth over the region of Kodiak a hundred miles distant from the volcano. All herbaceous vegetation was suppressed. Within three years a remarkable recovery of vegetation had taken place largely due to the revived activity of old plant parts buried beneath the ash layer. The ash contains a very small quantity of nutrient salts and possesses no "fertilizing" property as has sometimes been asserted. However it improves the physical condition of the old soil when mixed with it. The ash cover forms a very unstable bed for seedlings and they have no chance except in sheltered places. The ash is being rapidly re-

moved by the agencies of erosion and little will remain with the passing of another century. The bogs of the region were practically all destroyed and salt marsh conditions have been so modified that while a reestablishment of this feature is expected, the number of such marshes will be very much reduced. The alpine heath is beginning to reappear and a study of its reestablishment will result in a better understanding of the life conditions of an arctic alpine flora. Photographs of definitely located sites were found to be more advantageous in establishing vegetation stations than the meter quadrat method of Clements. —P. D. Strausbaugh.

648. OSBORN, T. G. B. On the habitat and method of occurrence in South Australia of two genera of lycopods hitherto unrecorded for the state. Trans. Roy. Soc. South Australia 42: 1-12. Fig. 3, pl. 1. 1918.—*Isotetes Drummondii* and *Phylloglossum Drummondii* are here recorded for the first time from South Australia. The association in which both are found is described in detail; it also includes a considerable number of other geophytes. The author regards it as "a seasonal swamp developed upon alluvial soil within the formation of sclerophyllous woodland." The species of *Isotetes* here reported is of peculiar interest in that it is seldom submerged.—P. D. Strausbaugh.

649. ROSENDAHL, C. O., AND F. K. BUTTERS. On the occurrence of *Pinus banksiana* in southeastern Minnesota. Plant World 21: 107-113. Map. May, 1918. The distribution of coniferous forests in Minnesota and their component species is briefly described. The numerous stations for *Pinus Strobus* and the two stations for *P. Banksiana*, which all lie outside the coniferous forest, are described and located on a map of forest areas. The latter tree is believed to have had a more extended range, restricted by prairie fires. [Rev. by Toumey in Jour. Forestry 16: 820-821. Nov., 1918.]—Forrest Shreve.

650. WALL, A. On the distribution of *Senecio saxifragoides* Hook. f., and its relation to *Senecio lagopus* Raoul. Trans. New Zealand Inst. 50: 198-206. Fig. 1, pl. 3. June, 1918. The first of these species is found only along Port Hills and the second is found exclusively on Banks Peninsula. Neither species invades the territory of the other while both occupy characteristically similar habitats—precipitous basalt cliffs. *S. saxifragoides* is the more xerophytic of the two and it is suggested that the restricted distribution of these closely related species may be explained by the difference in rainfall, the higher peaks of Banks peninsula having a greater amount of precipitation than Port Hills.—P. D. Strausbaugh.

FOREST BOTANY AND FORESTRY

RAPHAEL ZON, Editor

651. ANONYMOUS. Report of the Connecticut Park Commission for the two fiscal years ended September 30, 1918. 36 p., 12 pl. Hartford, 1919. —Since its creation in 1914 the State Park Commission has acquired 3,150 acres in 18 towns. These areas are well scattered through the State and include mountain tops, woodlands, and river, lake, and seashore frontage. The basic policy adopted by the Commission is to conserve for the entire public as much as possible of the natural beauties of the State. Special effort will be made to protect the animal and vegetable life in the areas acquired. The Commission feels that an immediate demonstration of what is meant by a State park in its largest and fullest sense is necessary, and it is urging the appropriation of sufficient funds to make this possible.—S. T. Dana.

652. FORSLING, C. L. Chopped soapweed as emergency feed for cattle on southwestern ranges. U. S. Dept. Agric. Bull. 745. Jan., 1919.—Severe droughts which occur at intervals of from three to ten years have in the past caused severe setbacks to the range cattle industry in the Southwest through the greatly reduced crop of range forage during such periods and through the lack of an economical feed as a substitute. A substitute, which is satisfactory to a large extent at any rate, has been found in soapweed (*Yucca elata*). Stock eat the leaves of the plant when other more palatable vegetation is scarce. The blooms and the growing tip in the center of the upper circle of leaves form an important forage for cattle in

late spring and early summer. Analysis has shown chopped soapweed to be comparable with native grasses and some of the poorer hay crops. The entire stem as well as the leaves can be utilized, and machines have been developed for chopping both stem and leaves into particles small enough to be eaten by cattle. As ensilage it is satisfactory, but the ensilage process is unnecessary where the soapweed is abundant. The chopped trunks or stems, which furnish the bulk of the feed, are palatable and, when fed with the chopped leaves, are readily eaten by stock without any softening process. There is no cumulative ill effect on the digestive tract of cattle fed on soapweed over a long period. Neither is there any harmful purgative effect from the soapweed, except occasional scouring when feeding is continued after the sap begins to rise in the plant. On the contrary, the soapweed tends to keep the digestive tract of the animal in good condition. It is possible that the occasional scouring effect may be overcome by delaying the chopping of the plants into feed until they have been allowed to dry out for several days after the dry leaves are burned. Soapweed is slow-growing, occupies a soil highly subject to wind erosion, and is a protection to stock, so that it is advisable to use the plant only as emergency feed. Only the larger plants should be selected for cutting, the smaller ones being left to protect the soil. Occasional plants tall enough for the blooms to be out of the reach of cattle should be left for seed plant and as a protection for stock. Small soapweed or bear grass (*Yucca glauca*), and sacahuista (*Nolina microcarpa* and *N. erumpens*) are somewhat similar to the soapweed, the small soapweed being found slightly farther north. It is possible that the greatest use of these plants for feed will be as ensilage. [See Bot. Absts. 3, Entry 180.]—G. A. Pearson.

653. HESSELMANN, HENRIK. Om vara skogsförnyringsatgarders inverkan pa salpeterbildningen i marken och dess betydelse for barraskogens förnyring. [Influence of silvicultural practice on nitrification of the soil and its importance in the reproduction of coniferous forests.] Skogavårdsfören. Tidskr. 16: 1-104. 1918.—For several years Hesselmann has been studying the pine heaths of northern Sweden where reproduction is especially difficult. Early investigations convinced him that the difficulty could not be attributed to lack of moisture. He therefore turned his attention to chemical conditions in the forest floor. Where reproduction is lacking, its failure is generally attributed to the fact that under certain conditions the organic matter of the forest floor is not converted into available nitrogen. These conclusions are based upon numerous chemical analyses of soils and plants under different forest conditions. Two general classes of forest soils are recognized. In one the transformation of organic matter into available nitrates is complete, while in the other, the process stops with the formation of ammonia. To the latter class belongs the bulk of the Swedish forests, namely, all the coniferous forests bearing heavy growths of moss and lichen. In forests of this type, clear cutting or even thinnings may bring about lively nitrification. The same result may be accomplished by cultivation in which the humus is mixed with mineral soil, even in closed stands. Decaying brush or logs also favor nitrification. If the layer of raw humus is very thick, cutting alone may not suffice to bring about nitrogen formation, although the production of ammonia is increased. Under such conditions, nitrification is hastened by cultivation or burning. Where large openings are made, the increased nitrogen supply together with increased light may favor herbaceous growth to the detriment of forest reproduction.—G. A. Pearson.

654. JOLYET, A. Cabanes à Chauves-souris. [Shelthefs for bats.] Rév. Eaux et Forêts 1918: 121-126. June, 1918. [Through abstr. by S. T. DANA in Jour. Forestry 16: 936-937.] Systematic breeding of bats as insect destroyers for use in the war-damaged timber is proposed. These animals are recommended because they take insects in the adult stage and so do not destroy the parasites. *Vesperugo* is the genus recommended.—E. N. Munns.

655. PEARSON, R. S., AND PURAN SINGH. Preparation of turpentine, rosin and gum from *Boswellia serrata* (Roxb.) gum-oleoresin. Indian Forest Rec. 6*: 303-345. 1919.—Field and laboratory investigations were conducted over a period of five years (1908-1912), to determine the best method of obtaining crude gum-oleo-resin of *Boswellia serrata*, and also of sep-

strating its chief components, gum, rosin and turpentine. The investigations also determined the number of trees available in Indian government forests for exploitation. Eighteen different species of the genus *Boswellia* (Burseraceae) are known to science, most of which grow in tropical Africa and India. *Boswellia* yields its gum-oleo-resin only from the living bark when the latter is scarified, the resin quickly coagulating when exposed to the air. The crude product has long been known and locally used in India as a frankincense and for medicinal purposes, and it is said to be equal in quality as a substitute for the Arabian and African frankincense. This is a medium to large-sized, deciduous species, with thin scaly bark, common on the driest and most exposed slopes of hills throughout India, where it often forms pure open forests. The 24 different government forest divisions contain 42,694,016 trees suitable for tapping, an average of 1,777,917 trees to each forest division. Expressed in terms of the American turpentine "crop" (8000 to 10,000 trees), this number would amount to from 4269 to 3336 "crops." Tapping of *Boswellia serrata* consists in blazing or shaving off a 6-inch-wide girdle of living bark to a depth of about half the thickness of the bark, at a height from the ground of from 2 to 2½ feet. The wound is freshened at intervals of from 4 to 6 days by shaving off a very thin layer of bark from the old blaze and also about 1 inch of the new bark on the upper edge of the wound. The hardened gum is scraped from the wound with a dull knife before each retapping operation. The average yield per tree per year is about 2½ pounds, the annual yield from 8000 to 10,000 trees amounting to from 18,000 to 22,500 pounds. The turpentine is obtained by steam distillation of the mass, the total yield being approximately 7 per cent, or from 157 to 197 gallons, and the remaining yield consists of nearly equal proportions of resin and gum, which are separated by means of solvents. Tapping is begun in November and terminated within 5 or 6 months, and the period during which the trees can be profitably worked is about 5 or 6 years. Investigations showed that continuous tapping for this period is not advisable, but that each year's tapping should be followed by 2 years' rest, fixing the rotation at 3 years. The effect of the tapping on the vitality of the trees is said not to be serious, for all of the wounds become completely healed. Owing, however, to the exceedingly uneven surface of the healed trunks it would seem very difficult, if not entirely impracticable, to again work these trees. Eighty-nine per cent of the turpentine from *Boswellia serrata* is distilled at temperatures of from 153° to 160°C., while 85 per cent of American turpentine distills between 155° and 163°C., and from 85 to 90 per cent of French turpentine passes over between 155° to 165°C. The general statement is made that *Boswellia* turpentine, consisting mainly of dextropinene, is as good as the best American and French turpentine. It dissolves colophony, dammar, sandarac, and soft copal, as readily as do pine turpentine. Varnishes made with it are practically identical with those made with pine turpentine, the important difference being that *Boswellia* varnishes dry more rapidly than others and have a uniformly dull "face," while varnishes made with American turpentine remain bright. As a substitute for the American product *Boswellia* turpentine would be placed between the French or Spanish and the Swedish or Russian oils. *Boswellia* rosin, similar in physical characteristics to pine rosins, can be used for all of the purposes to which pine rosins are put, except for soap making. *Boswellia* gum, in appearance not unlike gum arabic, is likely to be useful mainly for the manufacture of sizing for textiles, etc., but owing to the lack of complete solubility in water due to the presence of resin, it can not be used for these purposes without special treatment.—Geo. B. Sudworth.

GENETICS

GEORGE H. SHULL, Editor

656. BABCOCK, E. B., AND J. L. COLLINS. *Genetics laboratory manual*. First edition. 15.5 X 24 cm., xi + 56 p., 14 fig. McGraw-Hill Book Co. Inc.: New York. 1918. Rev. by L. J. COLE in Jour. Heredity 10: 19-40. Jan., 1919.

657. BARKER, E. EUGENE, AND R. H. COHEN. *Variability in the radish*. Jour. Heredity 9: 357-361, 384. Fig. 10. Dec., 1918.—Aim of study was to determine more exactly the

amount of variability in a representative kind of root vegetable, and also what genetic factors most affect yield. Four hundred seeds each, of three varieties, were used, two of which were supposed to be alike at time of maturity. Marked variation was found with respect to vitality of seed, marketable quality of roots and trueness to type, the latter character of which was shown statistically. Authors attribute these undesirable variations to improper seed selection, and particularly to mass selection. Methods for improvement by selection are suggested.—C. E. Myers.

658. CASTLE, W. E. Is the arrangement of the genes in the chromosome linear? *Proc. Nation. Acad. Sci. U. S. Amer.* 5: 25-32. 2 fig., 1 diagram. Feb., 1919.—On the assumption that the crossover percentages shown by any two pairs of genes are exactly proportional to their distances apart, Castle proposes an arrangement in three dimensions instead of the familiar linear series. He believes that this scheme gives more exact agreement of observation and expectation for large crossover values (long "distances"). Certain difficulties with respect to the smallness of the "double crossover" class are mentioned, and a subsidiary hypothesis to account for them is proposed.—A. H. Sturtevant.

659. CASTLE, W. E. The linkage system of eight sex-linked characters of *Drosophila virilis* (data of Metz). *Proc. Nation. Acad. Sci. U. S. Amer.* 5: 32-36. Fig. 3-4. Feb., 1919.—This applies to *D. virilis*, author's three dimensional arrangement of linked genes. [See preceding abstract.] Several predictions are made, as to the crossover values to be expected from certain untried combinations. For instance, glazed-rugose is put at 4 or 5 per cent or probably a little greater.—A. H. Sturtevant.

660. CLASSEN, K. Vererbung von Krankheiten und Krankheitsanlagen durch mehrere Generationen. [Heredity of diseases and of disease tendencies during several generations.] *Arch. Rassen- u. Gesellschaftsbiol.* 13: 31-36. 1918.

661. COCKERELL, T. D. A. The varieties of *Helianthus tuberosus*. *Amer. Nat.* 53: 188-192. 2 fig. Mar.-Apr., 1919.—The Jerusalem artichoke has been in cultivation more than three hundred years. It is a native of North America, and was used as food by Indians in pre-Columbian times. Has received little attention from breeders, is enormously prolific, and tubers are excellent food for man and beast. Recent experiments indicate that it may be an important source of sugar, in the form of syrup. Tops can be used as fodder. For these reasons, author believes it to be desirable to investigate the existing varieties and record principal characteristics.—He describes seven named varieties which differ widely in a number of characteristics. Cultivated forms produce larger tubers than the wild forms, and some varieties yield twelve pounds to a plant. Suggests possibility of crossing to improve type and size. Distribution of anthocyanin is variable in the different varieties.—C. E. Myers.

662. COCKERELL, T. D. A. Hybrid perennial sunflowers. *Bot. Gaz.* 67: 264-266. Mar. 1919.

663. COLE, LEON J., AND WILLIAM A. LIPPINCOTT. The relation of plumage to ovarian condition in a Barred Plymouth Rock pullet. *Biol. Bull.* 36: 167-182. 2 pl. Mar., 1919.—Description of changes in plumage in a hen, associated with development of an ovarian tumor. The change was made from the female plumage to that of a male. Following implantation of normal ovary, there was a reversal of plumage development. Special attention is called to width of bars as a secondary sexual character not affected by ovarian secretions.—H. D. Goodale.

664. COLLINS, J. L. Chimeras in corn hybrids. *Jour. Heredity* 10: 3-10. 6 fig. Jan. 1919.

665. COOK, O. F. Evolution through normal diversity. *Jour. Washington Acad. Sci.* 9: 192-197. Apr. 4, 1919.

666. DANFORTH, C. H. The developmental relations of brachydactyly in the domestic fowl. *Amer. Jour. Anat.* 25: 97-116. 5 fig. Mar. 15, 1919.—See Bot. Absts. 3, Entry 31.

667. DAVENPORT, CHARLES BENEDICT, ASSISTED BY MARY THERESA SCUDDER. *Naval officers, their heredity and development.* Carnegie Inst. Washington Publ. 259. 256 p. 1919.—See Bot. Absts. 3, Entry 246.

668. EDWARDS, F. W. Some parthenogenetic Chironomidae. *Ann. Mag. Nat. Hist.* 3: 222-228. Feb., 1919.—Females emerging from isolated pupae of *Chironomus cluraticus* and *Corynoneura innupta* (a new species) deposited eggs which developed parthenogenetically. Offspring were females in all cases. Males are unknown in both species. Author finds only two other recorded cases of parthenogenesis in Chironomidae, in *Tanytarsus boeimicus* and *Corynoneura celeripes*, and in each case offspring were females. Speculates briefly on origin of parthenogenesis.—A. Franklin Skull.

669. ELMIGER, J. Über schizophrene Heredität. [On heredity of schizophrenia.] *Psych.-neurolog. Wochenschr.* 19: 31-34. 1917-1918. [Through abst. by KURT MENDEL in *Neurol. Centralbl.* 1918: 760. Nov., 1918.]—Summary asserts (1) that "indirect" heredity of schizophrenia plays four times as important a rôle as "direct" heredity; (2) that indirect heredity can be proved in 8 per cent of the non-schizophrenous psychoses; (3) that direct tainting with structural abnormalities and mania for drinking occurs about equally in schizophrenous psychoses; (4) that marriages in which one party is schizophrenous average fewer children than normal marriages; (5) that marriages with both parties schizophrenous are rarities; (6) that average proportion of healthy to sick sibs was 2.5 to 1; (7) that schizophrenia is transmitted as a recessive.—J. P. Kelly.

670. GATES, WILLIAM H. Another hen that crowed. *Jour. Heredity* 9: 343-347. 6 fig. Dec., 1918.—An interesting instance of a hen that assumed complete male characters, associated with cystic degeneration of the ovaries. History of the bird is of particular importance, because she not only assumed plumage, spurs and head gear of male, but also assumed his habits: crowing, giving the characteristic male call for food, and treading hens. In habit, then, she differed from hens from which the ovary has been removed, since such birds lack these reactions, though normal hens occasionally exhibit them. H. D. Goodale.

671. GREGOR, ADALBERT. Rassenhygiene und Jugendfürsorge. [Race hygiene and the care of youth.] *Arch. Rassen- u. Gesellschafts-biol.* 13: 37-55. 1918.

672. GUTHERZ, S. Zur Lehre vom Ursprung der tierischen Keimzellen. [To the doctrine of the origin of the animal germcells.] *Arch. Mikrosk. Anat.* 92: 1-40. 2 pl., 1 fig. 1918.

673. HALSTED, BYRON D. Possible correlations concerning position of seeds in the pod. *Bot. Gaz.* 67: 243-250. Mar., 1919.

674. HARRIS, F. S. The sugar-beet in America. 13 X 19 cm., v + 342 p., 31 pl., 38 fig. Macmillan Co.: New York. Jan., 1919.—Chapter 5 (p. 213-230) discusses production of sugar-beet seed, dealing chiefly with cultural and commercial problems, but pointing out evidences of great hereditary diversity in beet populations, and importance of developing distinctive strains especially suited to American conditions. Attempt to produce variety with single-germ seed (as carried on by U. S. Department of Agriculture) made some progress, but results were not altogether satisfactory and this work was abandoned. Single-germ seed is desirable, but may not be possible of attainment. Discussion of improvement by selection is very brief and contains nothing new.—G. H. Skull.

675. HEAL, JOHN. Hybridization and cross-fertilization of flowers. *Gard. Chron.* 65: 25-26. Fig. 9. Jan. 18, 1919.—Popular account of author's experiments in hybridization. List is given of large number of interspecific hybrids. In case of *Begonia* these are divided up into those which resemble female and those which resemble both parents. [See Bot. Absts. 2, Entry 713.]—M. J. Dorsey.

676. HEGNER, R. W. Variation and heredity during the vegetative reproduction of *Arcella dentata*. *Proc. National Acad. Sci. U. S. Amer.* 4: 283-288. Sept., 1918.—By study of progeny of 171 "wild" specimens it was found that (a) variations in spine number occurred among descendants of single specimens during fission and were in part inherited, (b) "wild" population consists of large number of heritably diverse families so far as spine number is concerned. — Author next attempted to isolate heritably diverse lines from among descendants of a single specimen, produced by vegetative reproduction. During 39 days before selection was begun, among descendants of individual chosen as parent, 7 generations totaling 198 specimens were obtained with mean spine number of 10.87. Then selection was carried on for 64 days during which 22 generations totaling 1192 specimens were reared. During 6 successive portions of this 64-day selection period differences between mean spine numbers of high and low line were: -0.07, 0.50, 0.40, 0.48, and 1.16. Mean difference was 0.55. — Now followed 35 days of no selection during which 18 generations totaling 1325 specimens were reared. Differences for 4 successive portions of this no-selection period were 0.94, 0.07, 0.41, 0.43 and mean difference was 0.46. — Then he attempted to break low line into high and low portions. During 23 days of selection average difference in mean spine number of two divisions of ex-low line was 0.30. During a succeeding non-selection period of 11 days this average difference was 0.44. Thus two lines heritably diverse in spine number were isolated among the descendants of this low line. Similar results were obtained with respect to diameters. At least 2 apparent "mutations" occurred in low line. Small individual having 8 spines and 27 units diameter appeared in this line, but its progeny of 4th generation had regained diameter and spine number of low line. Progeny of other apparent "mutation" had mean spine number of 9.91, mean diameter of 23.51 units; mean spine number of its parent low line was 10.99, mean diameter 27.05 units, giving difference in mean spine number 1.08, and in mean diameter 3.54 units. These differences persisted; therefore this specimen was a sudden large variation that was inherited, i.e., a "mutation." Descendants of this mutant were most variable set studied. — Hence among numerous progeny of single specimen of *Arcella dentata*, produced by vegetative reproduction, are many heritably diverse branches due to slight variations and sudden large variations ("mutations"). This appears a true case of evolution observed in laboratory and occurring similarly in nature.—A. H. Middleton.

677. HERTWIG, OSKAR. Das Werden der Organismen. Zur Widerlegung von Darwin's Zufallstheorie durch das Gesetz in der Entwicklung. [The origin of organisms. Refutation of Darwin's theory of chance, through law in evolution.] 2nd enlarged and improved ed. 8 vo., xviii + 680 p., 115 fig. 1918. [From Publisher's announcement in *Zool. Jahrb.* 41: cover page 3. 1918.]—Author considers older theories of reproduction, position of biology as regards vitalistic and mechanistic conceptions of life, theory of the "specific cell" (Artzelle) as basis for origin of living creatures and genesis of many-celled organisms from "specific cells;" biogenetic law; maintenance of life processes through successive generations; classification; question of constancy of species; position of organisms in mechanism of nature; present standpoint of heredity; history of theories of descent; Lamarckism and Darwinism; critique of theory of chance, and selection.—J. P. Kelly.

678. INSEN, HEMAN L. Synthetic pink-eyed self white guinea-pigs. *Amer. Nat.* 53: 120-130. 5 fig. Mar.-Apr., 1919.

679. IKENO, S. Zikken-Idengaku. [A text-book on genetics] (Japanese). 3rd ed., rewritten and augmented. 22 × 14.5 cm., 230 p., 8 pl. 38 fig. Nippon-no-Rōmaji-Sha: Tōkyō, 1918. Price, 2 yen 80 sen [\$1.40].—Third edition of an elementary text-book on genetics, first published in 1913 and written in Romanized Japanese. It consists of short introduction, and three parts: Hybridization, Variation, and an Appendix; illustrative examples are mainly taken from Japanese investigations. In Part I (p. 5-110), after description of various kinds of hybrids, methods of investigation, and history of hybridization experiments since Koller, comes discussion of monohybrids, back-crossing and use of mean error for testing goodness of fit of Mendelian results being explained on them. Then follows description of

di-, tri- and polyhybrids. Presence and absence hypothesis is discussed in one whole, though short, chapter. Appearance of new characters by hybridization, epistasy and hypostasy, polymery, linkage, xenia, and non-Mendelian hybrids, etc. form subjects of another chapter. Still another chapter contains results of hybridization experiments with rice pursued by Dr. Katô. The hereditary behavior of some characters of this plant, which has remained undescribed till now, at least in any European language, is noticed below, each pair of characters mentioned being allelomorphous, the first one of each pair being dominant: awn (or spical part of palea, if awn is absent) red vs. colorless; palea brown vs. colorless; palea colorless vs. yellow; stigma purple vs. colorless; grains red vs. white; ripe grains not readily falling from axis vs. falling off very easily (as, for instance, by light wind); susceptibility to disease caused by *Leptosphaeria Caltanei* vs. immunity from it; all these characters segregate in F_1 in typical 3:1 ratio. Some quantitative characters were also studied; thus, in the hybridizations, high \times low stature, long \times short panicle, thick \times thin stem, the first-named characters being always perfectly or almost perfectly dominant towards the second; while in compact \times loose arrangement of grains and broad \times narrow leaf, the F_1 hybrid lies intermediate between the two parents; in respect to time of the appearance of first panicle, as well as amount of tillering, the F_1 hybrid belongs to second class given above. Mode of segregation of all these quantitative characters is very complex, owing without doubt to presence of multiple factors, and has not been completely studied. In next chapter, which is concerned with heredity of mankind, normal characters, as eye-color, skin-color, shape and color of hairs, etc., as well as teratological ones, as brachydactyly, etc., and diseases, are discussed. Part II (p. 111-170), devoted to variations, is divided into two chapters. In that relating to non-heritable variations, fluctuations come first, their general laws, causes, variation-curves and biometrical constants being explained. Pure line theory of Johannsen is explained by means of illustrative instances, both from plants and animals. Modification due to external influences is also described, and non-inheritability of acquired characters is discussed. In chapter relating to heritable variations, mutations, bud-variations, famous experiments of de Vries on *Oenothera*, and variations by combinations come in order. The appendix (p. 173-220) contains Japanese translation of Mendel's paper on peas. S. Ikeno.

680. IKENO, S. On hybridization of some species of *Salix*. *Jour. Genetics* 8:33-58. 1 pl. fig. Dec., 1918.—Reference is made to Wichura's *Salix* hybrids breeding true in generations beyond F_1 . Experiments conducted with few species show this is not always the case with respect to certain characters. Growth habit of stem, pubescence of leaves, color of stigma, all show segregation in F_2 but no definite Mendelian ratios were obtained. Stipulation of leaves is variable on F_1 plants, some leaves with stipules, others without on the same plant, or even the two halves of the same stem may differ in this respect. Segregation of this character in F_2 is not proved. *Salix purpurea multinervis* \times *S. gracilistylis* gave two types of individuals with catkins resembling one or the other parent. When like F_1 types of each of the two kinds were crossed together many of the same type of catkin and few of the opposite type were produced. When different types were mated approximate equality of the different types were secured in the offspring. In two of these matings a new type of catkin appeared. Both parents bred true for catkin type in one generation tested, 70 and 100 individuals having been grown. Several hypotheses are considered. Of these the most probable assumes one or both of parents heterozygous for indivisible factors not affecting the catkin type in the parental combination in which they occur. Thus the appearance of the two types of catkins in F_2 is not due to segregation of the main catkin factors themselves and all individuals in F_2 agree in carrying these in heterozygous condition. Their segregation was found to take place in F_1 , the peculiar method of this segregation is explained on the basis of the subsidiary factors. The same cross repeated one year later between the same female individual and either the same individual male or from the same clonal line gave a different result in that no twin hybrids were produced but all the progeny (nearly 50 individuals) were of purely maternal type and all of the same sex. Literature on "false hybrids" (pseudogamy, merogamy) is reviewed. Table of successful and unsuccessful hybridizations of various species of *Salix* is appended.—D. F. Jones.

681. KEY, WILHELMINE E. **Better American families.** Jour. Heredity 10: 11-13. Jan., 1919.

682. KEZER, ALVIN, AND BREEZE, BOYACK. **Mendelian inheritance in wheat and barley crosses, with probable error studies on class frequencies.** Colorado Agric. Exp. Sta. Bull. 249. 139 p., 9 pl., 10 fig. Oct., 1918.—Red and white chaff and beardlessness and beardedness were studied in wheat and gave the usual monohybrid ratios; when two characters were studied together the dihybrid ratio was obtained. Wheat crossed with emmer showed F_2 intermediate. In F_2 pubescence and black glume always occurred together. Hooded and beardless barleys gave 3 hooded:1 bearded. White six-rowed \times black two-rowed gave 9:3:3:1 with black and two-rowed dominant. Black two-rowed, bearded, crossed with white six-rowed, hooded, gave the usual ratio obtained with three factors. Cross between California six-rowed and Hanna two-rowed, gave F_1 with six rows of kernels and two rows of beards. This is an exceptional case and is peculiar to this cross. Tables showing behavior of F_2 and F_3 with probable errors are given. Many colored illustrations are given. Tables giving expected class frequencies for mono-, di- and trihybrid ratios for numbers up to 500 are given. Tables for the probable errors for mono-, di- and trihybrid ratios are given in numbers for populations up to 500.—H. H. Love.

683. LEGRAND, L. **The collocation of plasmas within the cell. II.** Sci. Amer. Suppl. 85: 60-64, 76, 77, 24 fig. 1918.—Diagrams illustrate conception of distribution of plasmas in fertilized egg, in form of concentric regions overlapping one another in various patterns and thus presenting wide range of variation in interrelated surface contacts. According as arrangements vary so do regions become active in different degrees or even remain latent. Similarly plasmas in paternal and maternal chromosomes by sliding and twisting movements of chromosomes become associated in different ways and to different degrees or even may be prevented from coming into contact.—B. M. Davis.

684. LENZ, FRITZ. **Über dominant-geschlechtsbegrenzte Vererbung und die Erbllichkeit der Basedowdialthese.** [Dominant sex-linked heredity and the inheritance of the Basedow dialthesis.] Arch. Rassen- u. Gesellschaftsbiol. 13: 1-9. 6 fig. 1918.

685. LITTLE, C. C. **A note on the fate of individuals homozygous for certain color factors in mice.** Amer. Nat. 53: 185-187. Mar.-Apr., 1919.

686. MCARTHUR, CLIFFORD L. **Transmissibility of immunity from mother to offspring in hog cholera.** Jour. Infect. Dis. 24: 45-50. Jan., 1919.—Investigators have previously noted that immune mothers produce pigs possessing some immunity to hog cholera. However most of sows used had passed through an outbreak of the disease and had not been subjected to the Dorset-Niles method. Author's experiments were carried on with sows rendered immune by Dorset-Niles anti-hog cholera serum with virus. Results of six sets of experiments indicate that pigs of sows immunized against hog cholera by Dorset-Niles method secured and retained immunity as long as they were sucklings, unless sow lost her immunity. In most cases it appeared that immunity of pigs lasted a few weeks after weaning. Second litters appeared, for most part, to be more highly immune while sucklings than first litter. Although exact method of transmission of antibodies is not known, indications are that they are transmitted through the milk.—R. K. Nabours.

687. MACCAUGHEY, VAUGHAN. **Race mixture in Hawaii.** Jour. Heredity 10: 41-47. Jan., 1919.

688. MACDOUGAL, D. T. **Culture of a potato hybrid, Solanum Fendleri \times S. tuberosum ("Salinas").** Carnegie Inst. Washington Year Book 17: 87-88. 1918.

689. McROSTIE, G. P. **Inheritance of anthracnose resistance as indicated by a cross between a resistant and a susceptible bean.** Phytopathology 9: 141-148. Mar., 1919.—Object was to study inheritance of resistant factors of bean anthracnose, and also to secure a com-

mercial type of white bean resistant to the disease.—Wells' Red Kidney, a bush bean, resistant to both strains of *C. Lindemuthianum* was used as one parent. The other parent was a selection of Michigan Robust, a white bean, resistant to one strain of the anthracnose, but very susceptible to the other. Reciprocal crosses were made. The F_1 were vigorous-growing pole-bean types, heavily podded. Seeds were intermediate in size and shape, dark navy blue to black. The F_2 showed a great variety of types, but the 3:1 ratio was observed in color and habit of growth.—Seedlings of the F_2 plants were inoculated artificially. Ten days later resistant ones were transplanted to the field. Different families varied in resistance and many showed close approximation to the 3:1 ratio, with resistant character dominant. Similar results were observed in the F_3 . Author notes that "the ratios obtained throughout between resistant and susceptible plants indicate quite clearly a single factor difference between resistance and susceptibility to the one strain of anthracnose concerned in the cross. The fact that resistance is dominant makes it more difficult to secure resistant types from the F_2 segregations, as it is necessary to grow all resistant F_2 plants through to the F_3 generation in order to tell whether they are homozygous or heterozygous for resistance." C. E. Myers.

690. MEVES, FRIEDRICH. Die Plastosomentheorie der Vererbung. Eine Antwort auf verschiedene Einwände. [The plastosome theory of heredity. An answer to various criticisms.] Arch. Mikrosk. Anat. 92: 41-136. 18 fig. 1918.

691. MIYAZAWA, B. Studies of inheritance in the Japanese Convolvulus. Jour. Genetics 1: 79-82. Pl. 2, 1 fig. Dec., 1918.

692. NABOURS, ROBERT K. Parthenogenesis and crossing-over in the grouse locust *Apollitis*. Amer. Nat. 53: 131-142. Mar.-Apr., 1919.—Females of *Apollitis* when kept in isolation, or when placed with males of another genus with which, apparently, they are unable to copulate, may produce offspring parthenogenetically. Crosses involving color patterns indicate that even when female mates some of her offspring may be parthenogenetically produced. Of the parthenogenetically produced offspring, 4470 have been females, 7 males. Diploid (oogonial) number of chromosomes appears to be 14, while in female produced parthenogenetically 9 whole chromosomes and some fragments were found in one somatic cell. Author suggests that egg develops parthenogenetically, or not at all, when sperm enters late.

Segregation occurs in eggs that develop without fertilization, as in other eggs. Crossing-over is demonstrated in eggs that develop parthenogenetically, as in other eggs, in amounts ranging from zero to 12 per cent. The occurrence of AA forms as result of cross-over may in part explain greater abundance of these forms in nature.—A. Franklin Shull.

693. NEWMAN, C. C., AND L. A. LEONIAN. Irish potato breeding. South Carolina Agric. Exp. Sta. Bull. 195. 28 p., 19 fig. June, 1918.—In South Carolina the Lookout Mountain potato (*Solanum tuberosum*) produces abundance of seed balls every year. The writers are attempting to secure potato that can be propagated by seed instead of by tuber cuttings. Data are presented showing that in plants producing seed there is no reduction in yield of tubers. Report covers first season's results with 5000 seedlings of Lookout Mountain. Seedlings were started in greenhouse, set in field in April, and harvested as tops died. The plants varied in size and habit of growth; some seedlings had 3 or 4 cotyledons. Yield of tubers and date of maturity were made basis of classification. Tubers varied in color from white to brown and to pink. On some plants both white and pink tubers occurred. Only 1900 plants produced an ounce or more of tubers, and only 64 yielded a pound or more, these few comparing favorably with yields of individual plants grown from tuber cuttings. John W. Bushnell.

694. NORTON, J. B. Washington asparagus: information and suggestions for growers of new pedigree rust-resistant strains. United States Dept. Agric. Circ. 7. 8 p. Feb., 1919.—See Bot. Absts. 3, Entry 655.

695. OLSON, P. J., C. P. BULL, AND H. K. HAYES. Ear-type selection and yield in corn. Minnesota Sta. Bull. 174: 1-60. 9 fig. 1918.—See Bot. Absts. 3, Entry 277.

696. PEARL, RAYMOND. On the mean age at death of centenarians. *Proc. Nation. Acad. Sci. U. S. Amer.* 5: 83-86. 1 fig. Mar., 1919.

697. PEARSON, K., AND A. W. YOUNG. On the product-moments of various orders of the normal correlation surface of two variates. *Biometrika* 12: 86-92. Nov., 1918.—Mathematical theory of the normality of correlation. Illustrations are provided.—*J. A. Harris.*

698. PENNETT, R. C., AND THE LATE MAJOR P. G. BAILEY. Genetic studies in rabbits. I. On the inheritance of weight. *Jour. Genetics* 8: 1-25. 12 fig. Dec., 1918.—A preliminary study of growth and its heredity in rabbits. Crosses were made between the large Flemish Giant and smaller breeds. The average weight in F_1 was intermediate. In F_2 , there was a shifting of the average toward that of the smaller breed. Variation was great in both generations. The authors consider the chief point of interest, in this phase of the experiment, to be the failure of the large form to reappear in F_2 in certain of the crosses.—The character of the growth curve is discussed at some length. While there seems to be some tendency for large breeds to mature late, a study of the crossbreds shows that a given final weight may be associated with almost any age of maturity within the limits found in the investigation.—*Sewall Wright.*

699. PENNETT, R. C. Note on the origin of a mutation in the sweet pea. *Jour. Genetics* 8: 27-31. 1 fig. Dec., 1918.

700. RITCHIE-SCOTT, A. The correlation coefficient of a polychoric table. *Biometrika* 12: 93-133. Nov., 1918.—A considerable number of methods are now available for determining the coefficient of correlation between two characters from a table of frequencies. Each of these has its own special appropriate field of usefulness, and the one to be selected will depend upon nature of measurements or observations, or of distribution of frequencies, under consideration. This paper deals with the mathematical theory of the calculation of correlation in cases in which each of the two characters is distributed into three groups.—*J. A. Harris.*

701. ROBERTS, HERBERT F. An early paper on maize crosses. *Amer. Nat.* 53: 97-106. 2 fig. Mar.-Apr., 1919.—Author expresses belief that work of McCluer (McCLUER, GEORGE W. Corn crossing. *Illinois Agric. Exp. Sta. Bull.* 21, 1892) has not been adequately appreciated by later investigators and maintains that McCluer shows inherent instincts of a geneticist although this paper far antedated the days of pure lines, Mendelism and factorial analysis. Attention is called especially to such important observations of McCluer as superiority of F_1 hybrids in point of yield, vigor and uniformity, when compared with their parents; inferiority in yield of F_2 segregates as compared with the F_1 ; inferiority in size, vigor and yield of plants as well as increased number of barren plants, abortive tassels, and poorly filled ears, on plots planted with self-fertilized seed as compared with plots planted with crossed seed or seed from open fertilized plants; general observations on the inheritance of purple aleurone, yellow endosperm, and starchy and sugary endosperm, together with recommendations for breeding of corn by farmers.—*C. B. Hutchison.*

702. ROBERTSON, T. BRAILSFORD, AND L. A. RAY. Experimental studies on growth. X. The late growth and senescence of the normal white mouse and the progressive alteration of the normal growth curve due to inbreeding. *Jour. Biol. Chem.* 37: 377-426. 8 fig. Mar., 1919.

703. SALISBURY, E. J. Variation in *Eranthis hyemalis*, *Ficaria verna*, and other members of the Ranunculaceae, with special reference to trimery and the origin of the perianth. *Ann. Bot.* 33: 47-79. 20 fig. Jan., 1919.—A record of observation on structure of indefinite flowers. In 360 flowers of *Eranthis hyemalis* number of perianth parts ranged from 5 to 9, with majority having 6; increase in number over 6 interpreted as usually due to fission of perianth primordia and not to transformation of nectaries or stamens. In 300 flowers number of nectaries varied from 4 to 12 with mode at 6; increase up to 12 thought due to bifurcations among

six nectaries usually present. Androecium in 300 flowers gave multimodal curve with 18 as lowest number of stamens, 30 as most frequent number, and with high modes at 24 and 27. Curve for gynaeceum shows minimum number to be 3 carpels with 6 as most common condition. In general, *Eranthis hyemalis* exhibits trimerous tendency. Increase of one type of organ does not take place at expense of another kind. Correlation tables show that stamens and nectaries or stamens and carpels, or nectaries and perianth parts tend to vary at same time and in same direction. There occurred transitional conditions between involucrel bracts and perianth segments; bright-colored bracts are rare but bract-like perianth parts are more common; since reversionary variations are more frequent than progressive ones, author thinks perianth in *Eranthis* has evolved from bracts; moreover in no case was perianth part replaced by nectary. In *Ficaria verna* androecium and gynaeceum show marked multimodal variations with maxima chiefly at multiples of three. Four hundred of 514 flowers had 3 carpels. Tables reveal a correlation (positive) in *Ficaria* between number of stamens and carpels, and between petals and stamens; and augmented corolla must not be attributed to staminal transformation. Data few for *Anemone nemorosa* but here also was a tendency to give maxima at multiple of three and positive correlation between stamens and perianth parts. Author believes early Ranunculaceae type was flower of alternating trimerous whorls with pentamerous condition derivative. [See Bot. Absts. 2, Entry 749.] -J. P. Kelly.

704. SCHALLMAYER, W. Vererbung und Auslese. Grundriss der Gesellschaftsbiologie und der Lehre vom Rassedienst. [Heredity and selection. Fundamentals of social biology and science of race improvement.] 3rd ed. 8vo, xvi + 538 p. Gustav Fischer: Jena, 1918. Through Publisher's announcement in Zool. Jahrb., 41: cover p. 2. 1918.] -In part I author takes up scientific basis of race improvement starting with discussion of theory of evolution and present teachings on heredity and variation, especially with reference to man; necessity for application of principles to race improvement; decline and extinction of peoples and problem of degeneration, observations on oldest existent civilized nation and sociological problem of aim and evaluation of state policy. Part 2 treats of aims and methods of race increase and of general eugenics. By fundamental revision, and condensation of matter of previous editions, and addition of new material, this third edition becomes almost a new book. -J. P. Kelly.

705. SCHULTZ, WALTHER. Versteckte Erbfaktoren der Albinos für Färbung beim Russenkaninchen im Soma dargestellt und rein somatisch zur Wirkung gebracht. [Hereditary color factors hidden in albino Russian hares, demonstrated in the soma, and purely somatically activated.] Zeitschr. Indukt. Abstamm. Vererb. 20: 27-40. 9 fig. Sept., 1918.

706. SHAMEL, A. D. Bud variation in dahlias. Jour. Heredity 9: 362-364. Fig. 11-12. Dec., 1918. -More than three thousand varieties are known to florists. Author believes many of these originated as bud variations. Variations of this kind were recognized as early as 1832. Author describes and illustrates a plant which bears three kinds of flowers, pure white, purple, and mixed white and purple. In some of the mixed flowers some of the petals are almost exactly half white and half purple. Plant has shown similar variability for five years. -C. E. Myers.

707. SHAMEL, A. D., L. B. SCOTT, AND C. S. POMEROY. Citrus fruit improvement: A study of bud variation in the Washington navel orange. United States Dept. Agric. Bull. 623. 138 p. 19 pl., 16 fig. 1918. -Detailed study of bud variation in the Washington Navel orange, (*Citrus sinensis* L.) Osbeck. Authors have recognized many distinct strains which they have succeeded in isolating through bud selection. Fourteen of these strains have been named and described. These differ widely, not only in character of fruit, but also in type of foliage and habit of growth. Only 5 of the 14 are of possible commercial value, the others being detrimental from the orchardist's standpoint. -In addition to these 14 strains, numerous minor variations including chimeras have been found, and in a census of the bearing orchards of California, the lowest percentage of off-type trees was found to be 10, while the highest was 75 per cent. In younger orchards an even higher percentage of diverse types is

found, indicating that prevailing methods of propagation are resulting in rapid deterioration of the variety. To obviate this, authors recommend propagation only of trees which have proved valuable in performance-record tests and they urge further the use of fruit-bearing bud wood with representative fruits attached.—Individual performance records are given of 64 trees extending over a period of four years. These records show conclusively that off-type fruits are produced by certain trees. [See two following Entries, 708, 709.—J. H. Kempton.

708. SHAMEL, A. D., L. B. SCOTT, AND C. S. POMEROY. *Citrus fruit improvement: A study of bud variation in the Valencia orange*. United States Dept. Agric. Bull. 624. 120 p. 14 pl., 9 fig. 1918.—Twelve distinct strains of the Valencia variety (*Citrus aurantium sinense*, L.) have been isolated by bud selection. Six of these twelve variations have been closely paralleled in the author's investigations of the Washington Navel variety. Individual performance records for 105 trees extending over a period of four years are given. These records show that off-type fruits are produced by the same trees year after year.—As in the Navel orange, most variations are commercially undesirable and their elimination can be accomplished by proper selection of fruit-bearing bud wood from trees with a high performance record. [See preceding and following Entries, 707, 709.—J. H. Kempton.

709. SHAMEL, A. D., L. B. SCOTT, AND C. S. POMEROY. *Citrus fruit improvement: a study of bud variation in the Marsh grapefruit*. U. S. Dept. Agric. Bull. 697. 112 p. 2 pl., 1 fig. 1918.—Study of bud variation in Marsh grapefruit (*Citrus grandis* Osbeck) shows that variability occurs in this species with about same degree of frequency as has been noted in Washington Navel Orange and other varieties of *Citrus*. [See two preceding Entries, 707, 708.] In census of one of the most valuable groves near Riverside, California, it was found that about 25 per cent of the trees produced fruits having from 30-90 seeds each, the commercial standard for seedless fruits being not more than 12. High correlation has been found between this "seedy fruit" and trees with drooping habit of growth. This correlation permits identification of such trees wherever they occur and once recognized they can be rebudded to desirable seedless type. No trees have been found thus far in which all fruits of a tree were completely seedless though individual limbs bearing seedless fruits have been found.—Six major strains are named and described. Among these is one having bell-shaped fruit which is associated with late ripening, another with rough fruit correlated with globular shape, and third with corrugated fruit having pyriform shape with deeply creased rind, inferior flavor and little juice. Performance record tests reveal fact that certain trees bear only every alternate year while others are always unproductive.—Minor fruit variations have appeared but occur less frequently than in other *Citrus* varieties studied. Among these variations are fruits which resemble oranges externally. Some of these orange-like fruits resemble orange-tangerines and grapefruits in flesh and juice characteristics. Other fruit variations have been observed such as raised or sunken sections or both, navel fruits, and chimeras, showing parts typical of two or more strains.—Authors have found also that fruits formed at other than normal blooming period often have pyriform or irregular shapes. These fruits usually have very thick rinds, coarse and bitter rag, and lack the distinctive grapefruit flavor of normal fruits borne by same trees. No explanation was found for the appearance of these characteristics in fruits produced out of season. The production of "off bloom" fruits appears, however, to be an individual characteristic. Authors state that there are well defined correlations between characters of fruit, foliage and flowers which, when fully worked out, will be of great importance in eliminating unproductive trees and in selecting trees for propagation. Variations all of which are commercially undesirable can be eliminated by selecting bud wood from tested trees.—J. H. Kempton.

710. SILVER, ALLEN. *Finch hybrids*. *Avic. Mag.* 10: 98. Mar., 1919.

711. SMITH, L. H. *Outline of a plan for corn breeding*. Illinois Agric. Exp. Sta. Circ. 221. 4 p. 1918.—Concise presentation, with certain details left to individual worker, of two plans of breeding. Method A, mass selection, is recommended for the busy farmer; method

B. *pedigree selection*, for the breeder who can give the requisite time and careful attention demanded. First two sections of outline are common to both methods; the two plans differ in subsequent breeding operations.—(1) Foundation stock. Suggestions are made regarding choice of variety and selection and preparation of material for testing.—(2) The preliminary ear-row test. Instructions are given regarding the planting of the ear-row test in single or, preferably, in duplicate series. Ear-remnants are saved for future use.—(3) Subsequent breeding. From this point the breeding work may follow either one of two systems.

Method A, *mass selection*. The seed-remnants of the most productive ears, as determined by ear-row test, are to be mixed and planted in an isolated seed plot. From this plot seed is to be selected—with due reference to certain field considerations—and mixed for subsequent planting. This mass selection in the field is to be repeated annually for subsequent planting with, or without, the special seed plot. Method B, *pedigree selection*. The distinct feature of this method is that the ear-row test is to be repeated another year with same material and that continuous selection and ear-row testing is included. It is recommended that ear-remnants of best ears, as determined by preliminary test, be carried over into more extensive ear-row test the second season. Alternate rows or portions of rows and checks are to be detasseled and seed is to be saved only from detasseled plants of best rows. This procedure is to be repeated in subsequent years. A multiplying plot from extra seed produced in the selected rows is provided for and commercial seed is to be selected from this plot.—E. C. Ewing.

712. STERN, ERICH. Psychologische Bemerkungen zur Vererbungs- und Familienstatistik. [Psychological notes on inheritance and familial statistics.] Arch. Rassen- u. Gesellschaftsk. 13: 67-74. 1918.

713. T. W. Hybridization and cross-fertilization of flowers. Gard. Chron. 65: 46. Jan. 15 1919.—Author reviews article by John Heal on the same subject as above in which Heal states that *Vallota purpurea* failed to hybridize. [See Bot. Absts. 2, Entry 765.] This species was successfully crossed with *Cyrtanthus sanguinea* by author and the late Sir Trevor Lawrence. The small growing species of *Cyrtanthus* hybridize readily. Breeding *Fuchsia* is made difficult by marked deterioration in the progeny.—Herbert Beaumont.

714. TILDESLEY, M. L. Preliminary note on the association of steadiness and rapidity of hand with artistic capacity. Biometrika 12: 170-177. Nov., 1918.—Preliminary note based on data on 60 pupils with respect to age, years trained in drawing, artistic capacity, mathematical and musical ability, and steadiness and rapidity of hand as tested by three maze-problems of varying difficulty. Entrance of maze was at A and exit at Q, a continuous pencil track being drawn from A to Q. Performance was considered the better, the fewer "bumps" the pencil track made with boundaries of the maze path. A single measure of efficiency was obtained by combining number of bumps with time taken, the inverse product of the two being used. The slender material makes conclusions suggestive, at best. Steadiness and rapidity of hand are not the result of training, but are probably innate characteristics developing with age. For crafts in which these characteristics are essential, they can be obtained better by selection than by training. Good craft, mathematical ability, and musical ability are only slightly associated with rapidity of hand, but this association is an initial one (most marked in maze 1) and tends to weaken with experience. It is suggested that possibly certain faculties may be most intense at certain stages of growth, and if education seizes upon them at this stage and maintains their intensity, we may overlook their true origin and suppose them created by education. Other suggestions needing further investigation are made.—J. A. Dellefsen.

715. TRANSEAU, EDGAR NELSON. Hybrids among species of *Spirogyra*. Amer. Nat. 53: 109-119. 7 fig. Mar.-Apr., 1919.—Hybridization between *Spirogyra communis* and *S. varians* and between *S. varians* and *S. porticalis* was observed in nature, and probable resulting hybrids were found. Character of zygote itself is always maternal, as would be expected from cytological behavior during conjugation. Reduction division is known to take place

during first two nuclear divisions of germinating zygote, followed by degeneration of three of the four nuclei. Segregation among hybrid filaments, therefore, is evident in first generation, but all cells of a given hybrid filament are alike. New combinations were observed as to shape and size of cells, shape and orientation of zygote. Natural hybridization among species of *Spirogyra* is, however, rare.—Merle C. Coulter.

716. VAN FLEET, W. **New everbearing strawberries.** Jour. Heredity 10: 14-16. Fig. 7-8. Jan., 1919.—See Bot. Absts. 2, Entry 732; 3, Entry 74.

717. WEATHERSWAX, P. **Gametogenesis and fecundation in Zea Mays as the basis of xenia and heredity in the endosperm.** Bull. Torrey Bot. Club 46: 73-90. Pl. 6-7, 8 fig. Mar., 1919.—Embryo sac arises from lowermost of row of four potential megaspores, the other cells disintegrating during its development. Egg nucleus is sister to one of polar nuclei. Antipodals organize a small tissue in chalazal end of sac, later absorbed. Two very small crescent-shaped sperms are developed from generative cell of pollen grain before dehiscence of anthers. Experiments showed that pollen tubes may grow through "silk" 25 cm. long in about twenty-four hours. Probably only forward end of tube is alive for perhaps 1 or 2 cm. Contents of pollen tube is usually discharged into one of synergids which break down shortly after, producing much confusion of cytoplasmic structure in micropylar end of sac. Guignard's observations on double fertilization were confirmed, the two fusions taking place almost simultaneously. Endosperm develops much more rapidly than embryo. Current explanations of cytological basis of xenia are supported. The peculiarities of xenia give to the endosperm a genetic significance and strongly suggest a sporophytic interpretation of this structure. Irregularities in distribution of chromosomes within endosperm makes possible a form of segregation of factors which may account in xenia for departures from expectations, and therefore the cytological data in general offers satisfactory interpretations of certain unusual behavior.—B. M. Davis.

718. WHEELER, WILLIAM MORTON. **Two gynandromorphous ants.** Psyche 26: 1-9. 8 fig. Feb., 1919.—Gynandromorph of *Lasius latipes* is combination of male and β -female. Female parts include entire middle of body (epinotum, petiole, hind legs), patches of head, other legs, and gaster, and strong tendency to dealation in hind wings only. Certain parts are intermediate. Internal structure could not be studied.—Second form described is dinergatandromorph (composite of male and soldier) of *Camponotus albocinctus*. Body is normal soldier, except smaller; head is much like soldier on left, resembles male on right. Appears to be first unmistakable case of soldier-male combination. Suggests that soldiers and workers are not determined by nutrition, but arise from different kinds of eggs. Author cites supporting evidence from termite castes, polarity of insect eggs, and experiments with castration; also regards new evidence as confirmatory of his theory that gynandromorph arises from pair of fused oocytes. Discusses other hypotheses briefly.—A. Franklin Shull.

719. WICKS, W. H. **The effect of cross-pollination in size, color, shape and quality of the apple.** Arkansas Agric. Exp. Sta. Bull. 143. 19 p., 9 pl. 1918.—See Bot. Absts. 2, Entry 733.

720. WOLFF, FRIEDRICH. **Ein Fall dominanter Vererbung von Syndactylie.** [A case of dominant inheritance of syndactyly.] Arch. Rassen- u. Gesellschaftsbiol. 13: 74-75. 1918.

HORTICULTURE

J. H. GOURLEY, Editor

721. BLAKE, M. A. **Winter injury to fruit trees in New Jersey.** Proc. Amer. Soc. Hort. Sci. 15: 24-25. (1918) 1919.—New Jersey experienced the most severe winter in 1917-18 since official weather records have been kept. The severe weather set in early in December and continued for weeks. Flower buds of the peach were killed except in the more favorable sections. The Wickson plum suffered injury to the blossom buds, and cane fruits suffered in

the central and northern counties of the state. The Synder was the hardest of the blackberries.—The most severe injury to trees themselves was with the peach where an unprecedented injury occurred to the roots even to a depth of 12-18 in., also considerable "collar" injury occurred, especially on the light soil types and upon dry knolls. The apple suffered similar injury but to a lesser degree; Gravenstein, Tompkins Co. King, Grimes and Baldwin suffered most. Varieties of peaches and apples which suffer most from root killing and collar injury are the ones that are the quickest to start into growth during favorable periods of winter and early spring.—*J. H. Gourley.*

722. BROCK, W. S. Spraying apple trees in bloom. *Proc. Amer. Soc. Hort. Sci.* 15: 80-81. 1918) 1919.—The apple varieties Ben Davis, Grimes, Winesap, Whitney, Lady, Westfield, Oldenburg and several other little known varieties were sprayed when in full bloom in three consecutive years, 1916-1918. The first spray was applied when the central bud opened, the second when the trees were in full bloom and the third two days later. Bordeaux mixture 4-4-100, lime sulphur 1:20 and scalecide 1:20 were used on different groups and the first two were both applied to certain trees. In all cases the trees were thoroughly drenched. The results showed no injury to blooms with the exception of some yellowing and premature dropping of the petals where the lime-sulphur was used. The trees bore full crops of fruit. It is suggested that an application of a fungicide during full bloom would be desirable, especially to scab-susceptible varieties.—*J. H. Gourley.*

723. CHANDLER, W. H. Winter injury in New York state during 1917-1918. *Proc. Amer. Soc. Hort. Sci.* 15: 18-24. (1918) 1919. The growing season of 1917 was one of the shortest on record, being at least three weeks shorter than normal. The temperature throughout the summer in many sections of New York was below normal and the rain-fall was heavy and as a consequence the wood went into winter in a poorly ripened condition. The winter was extremely cold and the duration of the cold periods was great. The feature of the winter that played such an important part in the injury that resulted was the low temperatures in December, for trees become more hardy as the winter advances. The fruit-growing regions of New York were visited during the summer of 1918 and the conditions recorded. In Niagara, Orleans and Monroe counties the weather was the least severe, with a temperature ranging as low as -7° or even -12° F. This temperature was reached in February rather than in December. While the buds and wood of most varieties of peaches were injured the J. H. Hale proved the most tender and Rochester the hardest. Pears were injured to some extent in the sap-wood and also such apples as Baldwin, Rhode Island Greening and Tompkins Co. King, while many Hubbardston trees that fruited heavy in 1917 were entirely killed. In Wayne county the temperature reached -20° F. and peach trees were badly killed. The older the trees and the heavier the crop in 1917 the worse was the injury. Younger trees recovered rather well. Sweet cherries appeared only slightly injured in the spring but later proved to have been little hardier than the peach. Angoulene pear trees were largely killed and Bartlett, Bosc and Kieffer suffered seriously. There was much injury to both old and young wood of Baldwin, Rhode Island Greening, Tompkins Co. King and Hubbardston apples. Ben Davis, Northern Spy and Twenty Ounce were seldom injured in this section. In the Ithaca section the temperature reached -24° F. and peach trees were more severely hurt than in Wayne county, yet less than 20 per cent failed to recover in some degree and one-half were worth retaining. If such trees were treated with 4 pounds of nitrate of soda they recovered much faster. More than half of the sweet cherry trees died during the summer, while such hybrid varieties as Reine Hortense and May Duke showed some injury and made a weak growth in 1918, and Eugenia showed no injury whatever. Little injury occurred to the sour cherry. Pears were injured but not many killed. Wickson and other *Triflora* plums were severely injured with the exception of Burbank and Abundance varieties. Many varieties of apples suffered, the hardier ones being Ben Davis, Winter Banana, Wealthy, Twenty Ounce, Fameuse, McIntosh, Oldenburg, and other Russian sorts. In Oswego county, where the temperature went still lower, even the Northern Spy and Wealthy were injured and many Baldwins were killed.—In Champlain county, where -30° F. was recorded, trees of Fameuse were

killed and some injury occurred to McIntosh and Oldenburg.—In the Hudson river section the temperature was as low as in Wayne and Ontario counties, but there was much less injury to all fruits with the exception of Baldwin apples that had fruited in 1917. This region had little rainfall the fall previous, and the trees were more mature than in the other sections where the rainfall was heavy. Some root-killing occurred in this region on the drier soils. A discussion is given concerning the nature of the injury and tissues involved, also on the duration of cold which will cause killing of buds and wood of the common fruits. Apparently a close relation exists between maturity (or power to resist cold) and the amount of foliage. If trees were defoliated or partially so the branches from which leaves were removed were much more tender. This seems to indicate that "something must come from the foliage during the late season that results in a change, perhaps in the nature of the protoplasm such that it becomes more resistant to freezing."—*J. H. Gourley.*

724. CONNORS, C. H. **Methods in breeding peaches.** *Proc. Amer. Soc. Hort. Sci.* 14: 126-127. (1917) 1918.—In an attempt to secure a number of peach stones by crossing known parents it was found that ordinary yellow paper sacks or bags of mosquito bar were not satisfactory. The paper bags caused a yellowing of foliage and hindered the proper development of the fruit while the mosquito bar bags had other disadvantages. Finally large tents of cheese cloth were built about the entire tree. The primary part of the work was to study inheritance of size of blossoms. The varieties used were Greensboro with large blossoms, Belle with medium blossoms, and Elberta and Early Crawford with small blossoms. Trees were divided into four equal parts and three parts were emasculated and pollinated with each of the other varieties. The fourth part was left to be self-pollinated. After the fruit had set, the tents were taken down and the fruits left to mature to almost the point of dropping. They were then picked, the stones removed, dried and placed in sand for stratification. In the spring they were opened and planted in nursery rows. The seeds of the early Clingstone varieties would not mature. Early freestones, such as Carman and St. John gave a small percentage from stone to tree, about 10 per cent, while the later freestones gave about 50 per cent. A total of 403 trees descended from known parents was planted in 1916 and 1073 seedlings from known parents were planted in 1917. In addition to the above there were planted also 258 seedlings from open pollinated blossoms. [See Bot. Abstr., Entry 608.]—*E. C. Auchter.*

725. GOURLEY, J. H. **Sod, tillage and fertilizers for the apple orchard. A ten-year summary.** *New Hampshire Agric. Exp. Sta. Bull.* 190. 40 p., 6 fig. 1919.—This paper reports a ten-year summary on an experiment with cultural practices and the use of fertilizers in a mature Baldwin apple orchard. The location of the orchard was such that the trees suffered from spring frosts or winter injury in six out of the ten years which lowered the average yield of the trees. The trees which remained uncultivated and unfertilized throughout the period of the experiment did not yield sufficiently well to warrant the use of the land for orcharding and they also made an inferior growth. The average yield was 135 pounds of fruit per tree and 5.09 inches twig growth per year. Tillage every other year resulted in a decided benefit to the trees which under farm conditions in New Hampshire might prove satisfactory, but better results were obtained by other methods of culture. The average yield of the two plots under this treatment was 191 pounds per tree and 6.11 inches twig growth per year. Clean cultivation, without the use of cover crops or fertilization, proved to be a successful method of reclaiming a run-down orchard, increasing the yield over the sod grown trees by 94 per cent and the twig growth by 43 per cent. It has shown evidence, however, that it could not be continued over a long period of years without additional fertility, since at the end of the ten-year period the trees were not making as good an average growth as at the end of the five-year period. Tillage with cover crops proved to be a slightly better system to follow in this orchard than clean tillage, but here the growth of the trees failed to maintain as good a growth in the second five-year period by 13 per cent. The yield of this plot was 268 pounds per tree and 8.21 inches twig growth per year.—Five plots which received the cultivation-cover crop system of culture were also treated with varying amounts of a complete fertilizer. These treatments resulted in an increased growth of the trees which averaged

12 per cent greater than the cultivation-cover crop plot. The yield of these plots, however, did not increase more than the untreated one, averaging 225 pounds per tree. The difference in yield in favor of any of the combinations of complete fertilizer used was not preponderant. It is suggested that the increase in size of the trees should result in an increased yield in the near future. The fertilizer which was richest in potash produced the largest apples each year and the quality of them was somewhat better.—Lime had no obvious effect upon the orchard.—The experiment is to be continued.—*J. H. Gourley.*

726. HENDRICKSON, A. H. The common honey bee as an agent in prune pollination. *California Agric. Exp. Sta. Bull.* 291: 215-236. 13 figs. 1918.—This is the second report of the part played by the honey bee in the pollination of prunes in the Santa Clara Valley. The experiment was carried on in 1917. The varieties French and Imperial prune were used in the test. Three trees of each variety were worked with, making a total of six. The trees were covered with mosquito bar tents. Two double tents were erected, each enclosing a pair of adjoining French and Imperial prunes. In only one of the double tents was placed a hive of bees. Pollen-carrying insects were excluded from the other double tent. Single tents covered the two remaining trees, a French and an Imperial. In each single tent was placed a hive of bees. The results showed quite strikingly in the case of the French prune, that although it is apparently self-fertile, still bees were needed to distribute the pollen sufficiently to cause even a light set of fruit. The tree enclosed with bees set 19 per cent while the trees from which bees were excluded set 0.43 per cent. The French tree enclosed with the Imperial and bees set 5.5 per cent. The average orchard set for this variety was 13.2 per cent. Quite similar results were secured with the Imperial prune. Although not as self-fertile as the French, still bees caused a set of 3.02 per cent as compared to a set of 0.31 per cent where bees were excluded from the tent. The Imperial tree was plainly benefited by cross pollination with the French tree. Both tests showed that even where the two trees were under the same tent with bees excluded the set was practically nil in both cases. Under the same tent but with bees present a very good set was obtained, thus again proving the great value of bees. Orchard counts for three years of certain French trees, some only one row away from the Imperial and others five rows away, showed in each case a slightly larger percentage of set on the French trees next to the Imperials than on those farther away. The first row was nearer the bees and evidently more thoroughly worked by them. The average orchard set in 1916 was 3.6 per cent for the French prune as compared to 13.2 per cent in 1917. It is suggested that the much greater quantity of bees in the orchard in 1917 was at least partly responsible for this increase. Observations and reports from different orchardists likewise showed an increase of fruit in 1917, wherever bees had been placed in the orchard. Heavily loaded trees in 1916 set a light crop in 1917 but made an unusually good vegetative growth. The reverse condition was also true. Trees that set lightly in 1916 made a good vegetative growth and set more heavily in 1917.—*E. C. Auchter.*

727. HENDRICKSON, A. H. Five years results in plum pollination. *Proc. Amer. Soc. Hort. Sci.* 15: 65-66. (1918) 1919.—This work was prosecuted with the object of securing reliable data on the fertility-sterility problem of plums for commercial growers in California. Over 100,000 hand pollinations were made to determine the effects of selfing and crossing and records were made on the normal set under orchard conditions which involved a count of over 175,000 blossoms. As a result of this work it was determined that the following Japanese varieties are self-sterile: Combination, Kelsey, Satsuma, Burbank, Wickson, Sultan and Abundance. The Climax is evidently self-fertile or partly so. The Domesticates that are clearly self-sterile are: Clyman, Tragedy and Robe de Sergeant, while the Imperial is uncertain. Grand Duke is probably self-sterile, and the French and Sugar prunes are undoubtedly so. There were no cases of inter-sterility observed in either Japanese or Domestic plums. [See Bot. Absts. 3, Entry 635.]—*J. H. Gourley.*

728. MOORE, J. G. Winter injury to fruits in Wisconsin in 1918. *Proc. Amer. Soc. Hort. Sci.* 15: 31-32. (1918) 1919.—Injury to the various tree fruits is discussed briefly. The apple suffered no more than usual, while plum trees were more severely injured. The most serious injury occurred to the flower buds, particularly those of the Sour Cherry.—*J. H. Gourley.*

729. NORTON, J. B. S. The relation of time of blooming to ripening period in peach varieties. *Proc. Amer. Soc. Hort. Sci.* 15: 66-67. (1918) 1919.—A tabulation is made from data given in Hedrick's *Peaches of New York*, to determine the relation of time of bloom and ripening of fruit with the peach. There appear to be many exceptions, but, in general, the later the blooming period the later the fruit ripens.—J. H. Gourley.

730. NORTON, J. B. S., AND C. E. LEATHERS. Conditions detrimental to seed production. *Maryland Agric. Exp. Sta. Bull.* 216: 175-226. 1918.—Several general factors detrimental to or those which hinder good seed production are first discussed. Among those discussed are lack of pollination, inbreeding, self-sterility, and crossing or mixing. The second part of the report discusses the factors which are detrimental to good seed production in several different horticultural plants. Difficulties in proper pollination are discussed as a factor in several of these plants. A bibliography is included. [See Bot. Absts. 1, Entries 628, 747, 3, Entries 276, 656.]—E. C. Auchter.

731. PADDOCK, W. Winter injury in Ohio. *Proc. Amer. Soc. Hort. Sci.* 15: 30-31. (1918) 1919.—The peach section about Port Clinton suffered seriously during winter of 1917-18, fully 90 per cent of trees above six years old were either killed or made nearly worthless. Fruit buds survived the winter on some trees that were so badly injured that no leaves were put forth during the following season and some of these blossoms matured their fruit. It was demonstrated that moderate pruning of frozen peach trees is better than light or severe pruning.—J. H. Gourley.

732. VAN FLEET, W. New everbearing strawberries. *Jour. Heredity* 10: 14-16. *Illus.* Jan., 1919.—The varieties of everbearing strawberries now being so largely grown in America are descendants of the Pan American, a sport or mutation of Bismark, a former commercial variety of the *Fragaria virginiana* type in which the runners are suppressed, favoring the successional production of fruiting crowns during the growing season. This characteristic appears to be hereditary in seedlings and hybrids of the Pan American. Progressive and Superb are the most widely grown varieties of the "everbearers," but they are poor plant makers. New seedlings are being grown of these and other varieties of this new type as well as crosses with the best spring-fruiting commercial varieties in order to add other desirable features to the everbearing varieties. The European Alpine strawberry *Fragaria vesca* is being used for crossing also as it has a long season of ripening.—A new type of *Fragaria vesca* has been introduced from Chili which appears promising. Seeds were forwarded from that country in 1914 by Prof. W. F. Wight and plants have been grown from them at Rockville, Maryland and Chico, California. The plants show greater vigor, fruitfulness and general adaptation to our climate than any Alpine which has been introduced. The plants have endured the hot, dry summers and fruited continuously from June until frost and also threw out a large number of strong runners. The berries were of good quality, but small and not firm enough for shipment. The stock is being used for further breeding work. Crosses were made with Chesapeake and Early Jersey Giant and about 400 plants fruited in the field in 1917 at Glendale, Maryland, showing high merit as June-fruiting varieties but displaying no tendency toward continuous bearing. Runners from two of the best plants were selected and crossed under glass early in 1917. Four of the resulting seedlings are very promising, producing large berries continually from July until November, and a good supply of vigorous runners. Crosses from this source appear likely to supplant those from the Pan American for commercial purposes.—J. H. Gourley.

733. WICKS, W. H. The effect of cross-pollination on size, color, shape, and quality of the apple. *Arkansas Agric. Exp. Sta. Tech. Bull.* 143: 19 p., 9 pl., 40 fig. 1918.—Results of three years' investigation of the immediate influence or effect of the male parent on size, color, shape, and quality of the fruit of the female parent are given. The work was done during the years 1915-16-17 in a typical commercial orchard. The varieties used were Ben Davis, Jonathan, Winesap, and Grimes. In all cases, besides being selfed, each variety was crossed with the other three. During the three years a total of 11,290 pollinations were made, which

produced 773 apples of all varieties. The total per cent of fruit set for the three years for Grimes as a female was 49.26, Ben Davis 32.71, Jonathan 18.67 and Winesap 9.42. Winesap was also the most difficult variety from which to secure pollen. The greatest mutual affinity was shown to exist between varieties as follows: Ben Davis by Grimes, Grimes by Jonathan, Grimes by Ben Davis, Ben Davis by Jonathan. Cross pollination as a rule increased the percentage of fruit set. In a study of the crossed fruit, no influence of the male pollen of any variety could be detected on size, color, shape or quality of the fruit of the female parent. Light, plant food, temperature, and moisture are considered as more important in influencing these factors. The author concludes that the facts obtained justify apple growers in planting varieties primarily for the benefit of cross-pollination to secure the normal development of the apple.—E. C. Auchter.

MORPHOLOGY, ANATOMY AND HISTOLOGY

E. W. SINNOTT, *Editor*

THALLOPHYTES

734. ATKINSON, GEO. F. *The genus Endogone*. Brooklyn Bot. Gard. Mem. 1: 1-17, 1918.—This obscure fungus, variously placed in the course of its history in all the three great divisions of fungi, is placed by the author in the Phycomyces, although it is said to approach close to certain Protoascomycetes. *Endogone sphagnophila* n. sp., growing on sphagnum, is described and comparisons are made with other species, especially with the subterranean *E. lactiflua* Berk. *E. sphagnophila* consists, when mature, of orange yellow, pulvinate bodies, 2-4 mm. in diameter, enclosed in a tough, white peridium, enclosing a mycelium made up of non-septate, branched coenocytic hyphae 10-15 μ in diameter. The two gametes are about equal in size and are multinucleate. An oval or elliptical zygote, 35-60 μ x 30-45 μ , is formed as an outgrowth from the point of conjugation of the pair of gametangia. The nuclei in the zygote (5-10 being derived from each gamete) appear to be associated and finally to fuse in pairs. Germination of these resting spores was not observed.—E. W. Olive.

735. DODGE, B. O. *Studies in the genus Gymnosporangium*. I. *Notes on the distribution of the mycelium, buffer cells, and the germination of the aecidiospore*. Brooklyn Bot. Gard. Mem. 1: 128-140. Pl. 1, 5 figs. 1918.—The author publishes observations on five species of *Gymnosporangium*: *G. Ellisii*, *G. bisepatum*, *G. transformans*, and *G. fraternum*, with telial stage on *Chamaecyparis*, and *G. clavipes*, with telial stage on *Juniperus*. The mycelium of *G. Ellisii* is intercellular and the fasciated hyphae invade every tissue except the cork. They are especially abundant along some of the medullary rays. Haustoria are not abundant but may be found occasionally in cells of the cortex medullary rays. In *G. bisepatum*, the intercellular mycelium is distributed through the cortex down as far as the cambium. The abundant haustoria are strikingly large. In *G. clavipes*, the mycelium is intercellular and lies for the most part well out in the cortex just beneath the cork. This species may develop spores in one year if found near the growing point where food is abundant; or the development may take two years if the infection is in regions less favorable. Strictly foliicolous, superficial sori may also develop, in which case the mycelium is limited in extent. *G. transformans* and *G. fraternum* are two leaf-inhabiting forms on *Chamaecyparis*, the former having its aecial stage on *Aronia*, the latter on *Amelanchier*. Haustoria are especially abundant in *G. fraternum*, sometimes eight or ten to a cell, but commonly two to four. In *G. transformans*, haustoria are only occasionally met with, in palisade and mesophyll cells. Other distinctive features are the buffer cells formed in the telial sori, which are especially long and prominent in *G. fraternum*; and the 2-celled teleutospores, which are also comparatively long in the latter species. The binucleated aecidiospores of *G. transformans* commonly divide at once, on germination, to make four-nucleated germ-tubes.—E. W. Olive.

736. McDougall, W. B. *Development of Stropharia epimyces*. Bot. Gaz. 67: 258-263, 1919.—The development of the fructification of this species from a very early stage of

the carpophore is described. The first internal differentiation of the carpophore is the appearance of the hymenophore primordium. The annular gill cavity is soon formed and enlarges rapidly. The universal veil disappears before the carpophore is mature. The development of the lamellae is similar to that of *Agaricus Rodmani* as described by Atkinson. This species agrees with *Agaricus*, *Armillaria* and *Stropharia* in having the hymenophore primordium develop before those of the pileus and stem, thus constituting an addition to the third of the three groups into which Atkinson divides the Agaricaceae with endogenous origin of the hymenophore. A close relationship between *Agaricus* and *Stropharia* is suggested. [See Bot. Absts. 2, Entry 1001.]—E. W. Sinnott.

PTERIDOPHYTES

737. BROWN, ELIZABETH WUIST. *Regeneration in Phegopteris polypodioides*. Bull. Torrey Bot. Club 45: 391-397. 3 fig. 1918.—Spores of this species were sown on Prantl's and Knop's nutrient solution and allowed to develop without changing. The primary leaves of the resultant sporophytes, mostly apogamous, were cut and placed on sand or inserted in it to a depth of from 1 to 2 mm. and moistened with the same solution or with distilled water. In only one case regeneration resulted, appearing near the base of a detached leaf of a young sporophyte. A cellular mass, resembling a prothallium, was formed, from which rhizoids, intermediate structures between leaves and prothallia, and true leaves, developed. These true leaves resembled those of normal young sporophytes and were followed by leaves of a much simpler type.—F. G. Smith.

738. STEIL, W. N. *A study of apogamy in Nephrodium hirtipes*, Hk. Ann. Bot. 33: 109-132. Pl. 5-7. 1919.—A summary is presented of the literature upon apogamy in ferns. The prothallium of the species studied develops from a spore, and attempts to induce typical apospory have been rarely successful, though the development of secondary prothallia from young sporophytes is readily induced by cultural conditions. The gametophyte never produces archegonia, but normal antheridia and antherizoids are formed. The embryo arises as a vegetative outgrowth of the prothallium, the apical cell of the leaf appearing first, then that of the root and then that of the stem. The foot is absent. The later development of the embryo resembles that of ferns where the embryo arises from fertilization. No nuclear migrations or fusions were observed in the prothallium at the time when the embryo begins its development. Sporogenesis in this species was also studied. After 8 sporogenous cells have been produced in the sporangium, they undergo incomplete division as a result of which the nucleus of each contains the diploid number of chromosomes—between 120 and 130. These cells function as spore mother cells and the (normally) 32 spores produced have the haploid number of chromosomes, which number is retained in the cells of the gametophyte and the apogamous sporophyte. The author discusses the origin of apogamy in this species.—E. W. Sinnott.

739. WATSON, E. E. *Relation between habitat and structure in Pteris aquilina*. Rept. Michigan Acad. Sci. 20: 246. 1918.—The diverse habitats in which this fern grows produce noticeable structural differences as to cell size, number of stomata in the leaf, and amount of interfascicular mechanical tissue in the petiole. [See Bot. Absts. 2, Entry 882.]—E. F. Woodcock.

SEED PLANTS

740. BUCHHOLZ, JOHN T. *Studies concerning the evolutionary status of polycotyledony*. Amer. Jour. Bot. 6: 106-119. 25 fig. 1919.—In the development of the embryo of a number of species and genera of conifers the author finds no indication of the splitting of cotyledons, but brings forward evidence that fusions between cotyledonary primordia occur during development, the average number of primordia in young embryos being consistently greater than the average number of mature cotyledons produced. This excess of primordia is believed to be a recapitulation of a more primitive condition where the cotyledons were more numerous. The primitive gymnosperm embryo had numerous, imperfectly cyclic cotyledons, probably

derived from spirally arranged leaves. "Cotyledonary fusions reduced the number of cotyledons and also produced cotyledonary tubes in many species. Dicotyledonous was attained either by a general fusion of many cotyledons in two groups, or by an extremely bilabiate development of a cotyledonary tube, and monocotyledonous is the result of a cotyledonary tube becoming unilabiate in the course of its development. The polycotyledonous condition is therefore primitive and the dicotyledonous one is derived." E. W. Sinnott.

741. CLARK, F. R. Bud formation of plant hypocotyls. Rept. Michigan Acad. Sci. 20: 336. 1918.—The author experimented on seedlings which do not normally produce buds along the internode of the hypocotyl. The tops were removed so that only this internode remained above the ground. *Solanum dulcamara* regenerated at its tip a new top, the first growth being observed at the end of 2 weeks. In plants of *Linum sp.* new growths appear from the side of the hypocotyl rather than from the tip. E. F. Woodcock.

742. COUTANT, MARY WOTHERSPOON. Wound periderm in certain cacti. Bull. Torrey Bot. Club 45: 353-364. Pl. 9, 3 figs. 1918. The two species studied were *Opuntia versicolor* Engelm. and *O. discata* Griffiths, growing in the vicinity of Tucson, Arizona. The anatomical structure of the stems, essentially identical, is described, especially the mature periderm, which is made up of alternating zones of suberized thin- and lignified thick-walled tissue. Wounds were made by slitting the stems with a razor or piece of glass, never more than to the center of the pith. Examination of the wounds on successive days showed the following results: a loss of starch in the region parallel to the wound and an increase of oxalate in the most exposed cells; the appearance in this starchless area of a meristematic layer, the phellogen; the discoloration and lignification of the cells outside of this; the storage of starch by the cellulose-walled phelloderm; the production by the wound-phellogen of alternating layers of thick and thin-walled cells; and the formation of a second interior meristematic layer, which produces new vascular bundles parallel to the wound surface. E. G. Smith.

743. DORETY, SISTER HELEN ANGELA. Embryo and seedling of *Dioon spinulosum*. Bot. Gaz. 67: 251-257. Pl. 10-11. 1919.—The general structure and the vascular anatomy of the embryo and seedling of this species is not markedly different from the ordinary cycad type, despite the large size of the whole plant and of the ovulate strobili and ovules. The cotyledons vary from 2 to 4 in number, are often deeply lobed and are multifascicular. Extrafascicular cambium is absent. The large size of the stem makes possible a clear demonstration of the origin and course of the complicated "girdling" leaf traces. E. W. Sinnott.

744. GLEASON, H. A. *Scirpus validus* for demonstrating procambium. Rept. Michigan Acad. Sci. 20: 153. 1918.—*Scirpus validus* is exceptionally fine for demonstrating procambium, since this plant grows from a basal meristem, and in a single cross section there may be seen all stages in the development from minute procambium areas of a few cells to bundles of mature form and size.—E. F. Woodcock.

745. HAYDEN, ADA. The ecologic subterranean anatomy of some plants of a prairie province in central Iowa. Amer. Jour. Bot. 6: 87-105. Pl. 15-28. 1919. A study of the gross and minute structure of the subterranean organs of 32 species of prairie seed plants, with particular reference to their physiological anatomy. In plants of dry habitats, mechanical tissue is abundantly produced and parenchymatous tissue reduced in amount. In moist habitats this condition is reversed. The amount of vascular tissue seems not to be closely correlated with habitat. Aerenchyma is abundant in swamp plants. The subterranean stem is the equivalent of the primary root, functionally, and is more efficient than the root in propagation. Attention is called to the usefulness of the pith as a water reservoir.—E. W. Sinnott.

746. KITCHIN, P. C. The Relation between the Structures of Coniferous Woods and their Penetration by Preservatives. Rept. Michigan Acad. Sci. 20: 233-221. Pl. 11-12. 1918. A careful study of the individual tracheids of *Larix laricina* and *Larix occidentalis*, with reference to their role as conductive structures in the penetration of preservatives. Though

similar in most of their characters, they differ in those structures most concerned in the passage of creosote oil into wood, i.e.,—in their penetrable bordered pit areas. This area is the pit membrane less the torus, and seemed to be the only factor which showed a consistent relation to the penetration of preservatives. At a pressure of 100 pounds per sq. in. for 30 minutes, with the oil at a temperature of 20°C. *Larix laricina* with a penetrable pit area of 0.01100 sq. mm. gave a longitudinal penetration of 0.15 inches, while *Larix occidentalis*, with a penetrable pit area of 0.01798 sq. mm. had a longitudinal penetration of 0.31 inches. The simple pit areas varied in each of the various species studied and there was no evidence available that they were a factor in the preservative penetration. The appendix includes measurements of the penetrable bordered pit area per mm. of tracheid length for several species of *Pinus* and one of *Abies*, as well as the penetrations on one specimen each of *Tsuga canadensis*, *Picea excelsa*, *Pinus taeda*, and *Pinus lambertiana*. [See Bot. Absts. 2, Entry 883.]—*E. F. Woodcock*.

747. MAULLEFER, ARTHUR. Parthenocarpie d'*Aristolochia Siph.* [Parthenocarpie in *Aristolochia Siph.*] Archives Sci. Phys. et Nat. Geneva 46: 90-91. 1918.—The examination of fruit of *Aristolochia Siph.* which apparently developed normally without fertilization showed, however, that the ovules were reduced to a spongy mass without anatomical differentiation.—*A. J. Eames*.

748. RECORD, SAMUEL J. Mahogany and some of its substitutes. Jour. Forestry 17: 1-8. 1919.—A key based on the gross characters of the woods is presented and is supplemented by descriptions of such structures as may be seen on a smoothly cut surface with the aid of a lens magnifying 10 to 15 diameters. Most of the important woods known to the trade as "mahogany" and also some woods commonly substituted are included. Representatives of 13 families and 27 genera, 11 of which belong to the Meliaceae, are described.—*Eloise Gerry*.

749. SALISBURY, E. J. Variation in *Eranthis hyemalis*, *Ficaria verna*, and other members of the Ranunculaceae, with special reference to trimery and the origin of the perianth. Ann. Bot. 33: 47-79. 20 fig., 10 tables. 1919.—Meristic and substantive variations in the flowers of these species are described in detail. Meristic variation is mainly the outcome of two tendencies—fission (producing an increase in number) and fusion (producing a decrease). It may occur in all floral regions and its appearance in one part of the flower is usually correlated with its appearance in the other parts. Instances of branched stamens and carpels and of bifurcated petals are recorded. The supernumerary perianth segments have from their position apparently originated by fission, and only rarely do we find evidence that they have increased as a result of the transformation of other structures. The occasional appearance of a single pentamerous whorl in species which normally have a 2-whorled, trimerous perianth is probably due to a fusion between a member of the outer whorl with one of the inner. The curve of meristic variation in the androecium and gynoecium exhibits several maxima which correspond to numbers that are some multiple of three, and the author concludes that the flower of the Ranunculaceae was primitively trimerous, a point of interest in connection with possible relationships between this family and the monocotyledons. Substantive variations in the nature of transitions between different floral organs, are not uncommon, and throw much light on the origin of the perianth. This the author believes to have been derived either entirely from modified foliage leaves or in part from bracts and in part from stamens. [See Bot. Absts. 2, Entry 703.]—*E. W. Sinnott*.

750. WOODCOCK, E. F. Structure of Mature Seed of *Eriogonum microthecum*. Rep. Michigan Acad. Sci. 20: 233-235. 1918.—The storage region inside the seed coats is endosperm and is differentiated into a central starch-containing region and an outer layer one cell in thickness which contains aleurone. The embryo lies in a median cavity in the starch endosperm in such a position that the flattened cotyledons are turned back so that their basal end is toward the chalazal region, and their tips toward the micropylar region. The storage tissue is endosperm, not perisperm as suggested by Johnson, and the embryo is curved, not straight as commonly stated.—*E. F. Woodcock*.

PALEOBOTANY AND EVOLUTIONARY HISTORY

EDWARD W. BERRY, *Editor*

751. CHAMBERLAIN, C. J. *The Living Cycads*. Univ. Chicago Science Series. 172 p. 91 fig. Univ. Chicago Press: Chicago. 1919.—An elementary and more or less popular account of the Cycads, the two concluding chapters of which, devoted to the Evolution of Structures and the Lines of Evolution, are compact accounts of the evolutionary trends in the cycad phylum as they are understood by the author.—E. W. Berry.

752. ELLIS, DAVID. *Phycomycetous fungi from the English Lower Coal Measures*. Proc Roy. Soc. Edinburgh 38: 130-145. [No. 13] Pl. 1, 8 text fig. 1918.—Fossilised hyphae with an occasional fructification are well known to every Paleobotanist who works with anatomically preserved petrifications to be extremely prevalent in all the horizons from which fossil plants have been described. Nevertheless remarkably few adequate descriptions of fungi have been published, and of those still fewer have been convincingly illustrated.—Until a much larger number of facts has been accumulated, any scientific consideration of the evolution or early distribution of the groups is impossible, so that descriptions of forms are to be welcomed. Dr. Ellis describes under the name *Palaomyces bacilliformis* hyphae with probable organs of reproduction from the Lower Coal Measures. The plant is described as saprophytic, found in the leaf-base of *Lepidodendron*. Renault's species, *Palaomyces gracilis*, Ellis re-describes and re-names, placing it in the genus *Peronosporites*. His text figure 2 is a little startling, but the paper is on the whole well illustrated.—M. C. Slopes.

PATHOLOGY

DONALD REDDICK, *Editor*

753. ALCOCK, N. L. *On the life history of the rose blotch fungus*. Kew Bull. Misc. Inf. 1918: 193-197. Pl. 6, 2 fig. 1918.—*Actinonema rosae* seems to winter in England only in the conidial stage as diligent search for the ascleterous stage has resulted in failure. This is comparable to the behavior of *Venturia inaequalis* in England and America. Similarly the two fungi in England produce lesions on the new wood in which the organisms hibernate and produce conidia abundantly the following year. Such lesions of *A. rosae* have been found on the varieties Juliet, Madame Ravary, La Tosca, Mrs. David Jardine, Gruss an Teplitz. Sections through acervuli on canes are illustrated. Recent literature on the disease and its control is reviewed.—D. Reddick.

754. APPEL, O. *Über die Anfälligkeit und Widerstandsfähigkeit verschiedener Kartoffelsorten gegen Krebs*. [On susceptibility and resistance of varieties of potatoes to wart.] Arb. Ges. Förderung Baues u. d. wirtsch. Zweckmässigen Verwendung der Kartoffeln Bull. 15. 1918.—Compilation of data showing that more varieties are susceptible to the wart than are resistant.—Time of maturing does not influence susceptibility. Of 170 varieties tested the following 13 are resistant: Arnika, Damasin, Windenburg, Ideal, Jubel, Juli, Lech, Magdeburger Blau, Nephrit, Nieren rote Delikatessen, Roma, Salat neue, Sechswochen. [From abstr. by O. von KIRCHNER in Zeitschr. Pflanzenkr. 28: 344. 1918.] D. Reddick.

755. BRUNER, STEPHEN C. *La pudrición del tomate y modo de evitarla*. [Decay of tomatoes and methods of prevention.] Rev. Agric. Com. y Trab. [Cuba] 1: 300-301. 2 fig. 1918.—A report of investigations relative to the cause of decay in tomatoes exported to the United States. The losses are attributed chiefly to faulty methods of handling the fruit prior to shipping. Specific troubles mentioned are blossom-end rot, sunburn, the leaf diseases due to *Cladosporium fulvum*, *Alternaria solani*, *Septoria lycopersici*, decay in green and mature fruit due to *Rhizoctonia*, ripe-rot due to *Mucor*, a decay of green and ripe fruit caused by *Phytophthora*, supposedly the species *P. terrestris*, and decay due to *Phoma destructura*. Recommendations for avoiding losses resulting from the decay of fruit in transit are given.—S. C. Bruner.

756. BRUNER, STEPHEN C. *Enfermedades de la vid en Cuba.* [Diseases of the grape in Cuba.] *Rev. Agric. Com. y Trab.* [Cuba] 1: 406-409. 8 fig. 1918.—A report relative to the diseases of the grape known to occur in Cuba. Downy mildew (*Plasmopara viticola*), powdery mildew (*Uncinula necator*), black rot (*Guignardia bidwellii*) anthracnose (*Gloeosporium ampelophagum*), leaf blight (*Cercospora viticola*) and rust (*Uredo vitis*) are reported. A brief description of each disease with suggestions for control are given.—S. C. Bruner.

757. BRUNER, STEPHEN C. *La "Phomopsis" de la berenjena.* [Phomopsis disease of egg plant.] *Rev. Agric. Com. y Trab.* [Cuba] 1: 468-469. 2 fig. 1918.—Note giving recommendations for the control of the eggplant disease due to *Phomopsis rezans*, based on the results of investigations conducted by the Florida Agricultural Experiment Station. The foot-rot or tip-over phase of the disease is reported as being the cause of serious losses in Cuba and the use of healthy seed is considered of especial importance in avoiding this trouble.—S. C. Bruner.

758. CRITTENDEN, C. G. *Pecan diseases other than scab.* *Georgia State Bd. Ent. Bull.* 49: 44-48. Pl. 12-15. 1918.—The following diseases are described briefly: rosette (non-parasitic); brown leaf spot (*Cercospora fusca*); kernel spot (*Coniothyrium caryogenum*); nursery blight (*Phyllosticta caryae*); anthracnose (*Glomerella cingulata*); crown gall (*Bacterium tumefaciens*); mildew (*Microsphaera alni*).—D. Reddick.

759. DARNELL, SMITH, G. P. *Diseases of tobacco plants: blue mold and a bacterial disease.* *Agric. Gaz. New South Wales* 29: 82-88. 3 fig. 1918.—Popular discussion of blue mold caused by *Peronospora hyoscyami*.—A disease following mold and thought to be bacterial in nature is described.—Brief descriptions of other diseases of tobacco including those caused by *Phytophthora nicotianae* and *Bacillus nicotianae*.—D. Reddick.

760. DOLDGE, ETHEL M. *The characteristics of citrus canker and its eradication.* S. Afric. Dept. Agric. Bull. 3. 9 p., 13 fig. 1918.—Popular description of the disease, means of dissemination of *Bacterium citri*, and the measures employed in South Africa to eradicate the disease.—The disease was introduced from Japan in 1905. Its subsequent spread has been confined practically to wet seasons. Bordeaux mixture has not proved an effective preventive. In 1917 further outbreaks occurred and in December of that year a sum of money was granted for eradication of the disease. All nurseries whether infected or not have been destroyed and the owners compensated. About 15,000 orchard trees have been found infected and destroyed by fire. Up to March 31, 1918, £28,000 was expended for inspection of orchards and nurseries and the eradication (including compensation) of infected trees.—D. Reddick.

761. DUFRENOY, J. *Les conditions écologiques du développement des champignons parasites. Etude de géographie botanique.* [Ecological conditions in the development of parasitic fungi.] *Bull. Soc. Mycol. France* 34: 8-26. 1918.

762. DUFRENOY, JEAN. *Sur les tumeurs du pin maritime.* [Tumors of the pine.] *Compt. Rend. Acad. Sci. Paris* 166: 355-357. 1918.—Resin-exuding galls are abundant on the trunks and roots of maritime pine [*Pinus pinaster*] in the Arcachon forest. The structure of the gall is described in some detail. Two kinds of cocci were observed and isolated and are thought to be the cause of the trouble.—D. Reddick.

763. EARLE, F. S. *La Diplodia natalensis.* *Rev. Agric. Com. y Trab.* [Cuba] 1: 50. 1918.—A brief note. The author comments on an article by Bruner relative to *Diplodia natalensis* and gives the results of his own infection experiments with this fungus on citrus fruits. The organism penetrates the calyx, after which it finds ready access to the interior of the fruit by way of the peduncle.—S. C. Bruner.

764. FISHER, D. F. *Apple powdery mildew, and its control in the arid regions of the Pacific northwest.* U. S. Dept. Agric. Bull. 712. 28 p., 3 pl., 3 fig. 1918.—Presence of powdery mildew (*Sphaerotheca leucotricha*) on apples (*Pyrus malus*) in arid Northwest may cause 50

per cent loss.—Experiments in pruning out infected twigs did not give satisfactory control, nor did spraying the trees while dormant with lime-sulfur solution. Use of sulfur sprays in the growing season gives control but injury, especially to fruit, is likely to result. Under the conditions the following spraying program has proved best: Lime-sulfur solution (1:50) when the blossoms show pink and again when the blossoms have fallen; ammoniacal copper carbonate (5:3:50) three to four weeks after the second application. Many fungicides were tested including colloidal sulfur, a formula for the preparation of which, is given. *D. Reddick.*

765. HARTER, L. L. A hitherto-unreported disease of okra. *Jour. Agric. Res.* 14: 207-212. Pl. 23. 1918.—Disease occurs only on stems and pods of okra (*Abelmoschus esculentus*) where it appears as oval to oblong spots 2 to 3 cm. long. Cause of the disease is *Ascochyta blamoschi*, which is described as new. Abundant pycnidia are produced on the lesion and mycelium grows through the pod and into the seed from which it was isolated repeatedly. Pathogenicity was determined by experiment. Specific tests to infect leaves were unsuccessful. [See Bot. Absts. 1, Entry 409.]—*D. Reddick.*

766. HOFFER, GEORGE N., A. G. JOHNSON, AND D. ATANASOFF. Corn-root rot and wheat scab. *Jour. Agric. Res.* 14: 611-612. 1918.—The species of *Gibberella* occurring on corn (*Zea mays*) stalks and on wheat (*Triticum aestivum*) cross infect and are probably identical. Confirming the experimental inoculation work, field observations have shown a conspicuously greater abundance of wheat scab in fields where wheat was grown immediately following corn that was infected with the *Fusarium* rot of root and stalk. *D. Reddick.*

767. HUMBERT, J. G. Tomato diseases in Ohio. *Ohio Agric. Exp. Sta. Bull.* 321: 157-196. 2 figs. 1918.—The symptoms, cause and control of the various parasitic and non-parasitic diseases affecting tomatoes in Ohio are considered. *Fusarium* wilt-resistant tomato trials for 1916 and 1917 are reported. The Acme strain as selected by Edgerton in Louisiana for *Fusarium* wilt resistance was immune to this disease under Ohio conditions and also exhibited resistance to *Septoria* and *Alternaria* leaf diseases. Beauty strains from Tennessee were highly resistant to this disease. Bonny Best, Acme and Early Detroit have responded to selection for disease resistance. Correlation of the prevalence of tomato diseases about Marietta with weather conditions for the growing periods over a 7-year interval show that a constant relationship evidently exists between high temperatures with low precipitation and a serious occurrence of *Fusarium* wilt and point rot. *H. W. Dye.*

768. JENKINS, ANNA E. Brown canker of roses, caused by *Diaporthe umbrina*. *Jour. Agric. Res.* 15: 593-599. Pl. D (colored), 46-47. 3 figs. 1918. The disease is known to occur in Eastern United States and probably is widely distributed. Cankers occur on any portion of the cane, the lesion being raw umber in color and sometimes surrounded by a purple border.—A technical description, with illustrations, of *Diaporthe umbrina* n. sp. is included. The pycnidial stage is like species of *Phomopsis*. Perithecia and pycnidia occur on the lesions and both have been developed in culture. Proof of the pathogenicity of the organism is furnished.—Experiments in controlling the disease by cutting out and burning affected canes gave negative results.—*D. Reddick.*

769. JOHNSTON, J. R. El plátano y sus enfermedades. [The banana and its diseases.] *Rev. Agric. Com. y Trab. [Cuba]* 1: 419-421. 3 figs. 1918.—Short account of the diseases of the banana plant (*Musa paradisica* and *M. sapientum*). The Panama disease due to *Fusarium oxysporum* has caused serious losses in Cuba, being especially destructive to the varieties "manzano" and "Johnston." Recommendations for its control are given. Other diseases discussed are: root disease due to *Marasmius stenophyllus*; bud rot of the variety "macho" (possibly of bacterial origin); fruit rot (*Gloeosporium musarum*); and collar rot (cause not determined).—*S. C. Bruner.*

770. JOKL, MILLA. [Pythium conidiophorum nov. sp., ein Parasit von Spizgyra.] *Osterr. Bot. Zeitschr.* 67: 33-37. 1 pl. 1918.—[From abstr. by MATOVSCHKE in *Zeitschr. Pflanzenkr.* 28: 344. 1918.]

771. JONES, DONALD F. Segregation of susceptibility to parasitism in maize. *Amer. Jour. Bot.* 5: 297-300. 1918.

772. KEITT, G. W. Inoculation experiments with species of *Coccomyces* from stone fruits. *Jour. Agric. Res.* 13: 539-569. Pl. 55-69., 3 figs. 1918.—"This work has defined rather than solved, certain fundamental problems regarding host relationships and specialization of parasitism within the group of fungi under investigation." From the standpoint of host relationships, the strains of fungi studied are tentatively grouped as follows, according to the hosts from which they were procured: (1) *Prunus cerasus*, *P. avium*, *P. mahaleb* and *P. pennsylvanica*, (2) *P. domestica*, (3) *P. virginiana*, (4) *P. serotina*; but minor variations occur among the strains within the groups.—*P. mahaleb* was infected in varying degrees by inocula from all the host sources tested. *P. insititia* is also notably susceptible and possibly also *P. cerasifera*. *P. serotina* and *P. virginiana* on the other hand are notable for their resistance to cross infection, while *P. padus* was infected only by strains from *P. virginiana*. It appears from these tests that in Wisconsin no serious infection of cultivated cherries is induced by inocula from wild hosts (possibly excepting *P. pennsylvanica*) but it is evident that *P. americana* may act as a harbinger of infectious material for cultivated plums. [See Bot. Absts. 1, Entry 419.—D. Reddick.]

773. KIESSLING, LUDWIG. Über schädliche Nebenwirkungen der Formalinbeizung des Saatgutes auf die Keimung. [The injurious secondary effects of the formalin treatment of seed grain, upon germination.] *Jour. Landw.* 66: 7-51. 1918.—KieSSLing finds that commercial formaldehyde in the usual diluted solutions produces a distinctly injurious effect upon the vigor with which seed grain germinates. Soil conditions may therefore materially influence the injury which is apparent when the seedlings emerge. This injurious effect is intensified by agitation of the seed during treatment in a solution of formaldehyde, in the same way as if the treatment were prolonged or the solution made stronger. Using the ordinary treatments, it was found that mechanical injury of the seed, even of the embryo, did not materially increase the injury to wheat by formaldehyde. Poor seed may be temporarily benefited; but the residual effect of the treatment is generally worse with such seed. However, individual lots of seed differ widely in their reaction to the injurious effect of formaldehyde, and for various reasons.—An apparent stimulus to germination is sometimes evident. This may be due to the removal of certain inhibiting organisms, such as would occur on poor seed, or, in the case of new seed in which the germ has not yet attained full maturity, to an effect resembling the stimulus of narcotics. Such a stimulating effect may serve to neutralize the injury caused by treatment and confuse the results of a whole series of tests.—Impurities do not change the character of the effect of formaldehyde on seed grain, but generally do intensify it. Methyl alcohol is not the only impurity which may be concerned.—It is found that the dry storage of treated wheat is less injurious than storage under moist conditions. Treated wheat should be planted at once, however, and not stored if storing can be avoided. Oats were not found to be injured by storage after treatment.—Some reagent other than formaldehyde for the disinfection of seed grain is very much to be desired. Hiltner's formaldehyde mixtures (sublimiform and cupriform) are considered preferable because of the reduced proportion of formaldehyde required.—The compulsory treatment of seed grain is not considered feasible because of the risk of injury to germination by any of the treatments which have been devised and recommended for use in prevention of the smuts and other seed-borne diseases of cereals. It is also evident that commercial seedsmen cannot make use of formaldehyde to disinfect seed grain for sale, particularly wheat.—Aldrin A. Potter.

774. LEE, H. ATRERTON. Further data on the susceptibility of rutaceous plants to citrus-canker. *Jour. Agric. Res.* 15: 661-665. Pl. 60-63. 1918.—Needle-prick inoculation tests made in the Philippine Islands with *Pseudomonas citri* upon 24 species representing 20 genera of the family Rutaceae show that 19 of the species are susceptible in greater or less degree.—*Serentinia burifolia*, *Argel marmelos* and *Balsamocitrus gabonensis* are immune to the disease and *Zanthoxylum rhetsa* and *Triphasia trifolia* seem to be immune. *Chalcas exotica*. Ata-

Puccinia disticha and *Fortunella japonica* are strongly resistant. — *Fortunella kinsii* on the summits of mountains (1500 feet elevation) in South China was found with abundant cankers. It is thought that this species may have been an original wild host from which the disease spread to cultivated species.—D. Reddick.

775. LEVINE, M. N., AND E. C. STARKMAN. A third biologic form of *Puccinia graminis* on wheat. Jour. Agric. Res. 13: 651-654. 1918.—A strain of *P. graminis* was found in Oklahoma which readily infects the six differential hosts employed in the separation of the forms *tritici* and *tritici-compacti*. It is not named. [See Bot. Abst. 1, Entry 422.]—D. Reddick.

776. LINSBAUER, L. Richtlinien des Pflanzenschutzes im Gemüsebau. [Directions for plant protection in the vegetable garden.] Österr. Gartenzeitg. 13: 41-48. 1918.—Directions for disinfecting seeds, sterilizing soil and general sanitary precautions to be observed. [From abstr. by MATOUSCHEK in Zeitschr. Pflanzenkr. 28: 337-338. 1918.]—D. Reddick.

777. MAGNUS, WERNER. Wund-Callus und Bakterien-Tumore. [Wound callus and bacterial tumors.] Ber. Deut. Bot. Ges. 36: 20-29. 1918.—This paper deals only with German researches on crown gall (1915-1918). The author has discovered that it is sometimes difficult to distinguish between crown gall and callous formation. He has also discovered that when a crown gall develops abundantly it interferes more or less with normal growth callous-growth in his experiments). He thinks that crown gall develops only in wounds and thus affords important analogies with animal cancer.—For his experiments the author used slices of carrots in petri dishes inoculating with *Bacterium tumefaciens* received from Kral's laboratory. Here he found that inoculations with *B. tumefaciens* on the cut surface often led to tumors which interfered with the development of the callus on the opposite surface although in the checks that was the part which naturally developed callus. The paper apologizes to the extent of two pages for the various mistakes of the German investigators of crown gall, Friedemann and Magnus, Blumenthal and Hirschfeld. The original may be consulted for details.—The most interesting thing is the concluding paragraph and the literature citations, which show that the *Zeitschrift für Krebsforschung*, which in 1912 remarked in a review, that crown gall had nothing in common with cancer except its name (Krebs), is now receiving publications from German medical men on this subject, as is also the *Zeitschrift für Hygiene und Infektionskrankheiten*. Furthermore, the disease has now been made a subject of study in the Berlin University Institute for cancer investigations. [See Bot. Absts. 2, Entry 610.]—Erwin F. Smith.

778. MASSEY, L. M. More about rose diseases. Amer. Rose Ann. 1918: 64-71. Pl. 4. 1919.

779. NOWELL, WILLIAM. The control of cacao canker in Java. [Rev. of: HALL, C. J. J. De bestrijding van den cacaoanker op de indermoring "Kemiri." Meded. Lab. Plantenz. Batavia 30. 1917.] Jour. Agric. News Barbados 17: 78-79. 1918.

780. POLE EVANS, I. B. Teff rust. Kew Bull. Misc. Inf. 1918: 228-229. 1918. — *Uromyces pedicellata* n. sp. occurs on *Eragrostis abyssinica* in South Africa and crops grown late in the season are considerably damaged. The fungus occurs also on an indigenous species *E. curula*.—D. Reddick.

781. POLE EVANS, I. B. Citrus canker in South Africa and its eradication. S. African Jour. Indus. 1919: 1-24. 15 fig. Jan., 1919. — Popular account of citrus canker, caused by *Bacterium tumefaciens*, including a short history of the disease in South Africa and a description of the eradication campaign inaugurated.—The total expenditure on citrus canker inspection, eradication and compensation for trees destroyed up to December 31, 1918 is £51,000.—Copies of the quarantine proclamations are included.—"In conclusion, it may safely be said that the spread of the disease has been definitely checked, and that the only thing which now endangers the eradication work is the supply of necessary funds."—D. Reddick.

782. RANKIN, W. HOWARD. *Manual of tree diseases*. 20 × 14 cm., xx + 398 p., 79 fig. MacMillan Co.: New York. 1918.—Diseases of the more common trees of the United States are treated. Discussions of these diseases are grouped into chapters under the common name of the tree affected, and the chapters are arranged alphabetically. In a general chapter are included discussions of the diseases common to all kinds of trees, such as damping off of seedlings, temperature injuries to leaves and woody parts, smoke and gas injuries, wood rot, and the like. The species of trees affected, the geographic distribution, destructiveness and symptoms of the different diseases are presented in full. The causal agent of the diseases is briefly described, and when it is a parasite some details of life history are given with suggestions as to control.—One chapter is devoted to tree surgery.—In the appendix are given common names and scientific names, a glossary of technical terms employed and a bibliography of pertinent literature.—D. Reddick.

783. ROBBINS, W. W., H. E. VASEY, AND G. E. EGGINTON. *Cleaned, treated and tested seed for Colorado*. Colorado Agric. Exp. Sta. Bull. 238. 40 p., 11 fig. 1918.—Part III (p. 20-32) is entitled "Methods of seed treatment for the prevention of diseases in certain farm crops."—D. Reddick.

784. SAWADA, KANEYOSHI. [Japanese.] [A new rust fungus parasitic on the rose.] Trans. Sapporo Nat. Hist. Soc. 7: 36-40. 1918.—English description of *Kuehneola rosae* n. sp. [See Bot. Abstrs. 2, Entry 110.]

785. SCHOEVEERS, T. A. C. *Meer staatsbemoeiing op het speciale gebied van bestrijding van plantenziekten en schadelijke dieren*. [More information on the special subject of controlling plant diseases and destructive animals.] *Cultura* 30: 164-171. 1918.

786. SPOONER, C. S. *Pecan scab (Fusicladium effusum)*. Georgia State Bd. Ent. Bull. 49: 38-48. Pl. 14-15. 1918.—Scab is the most serious disease of the pecan (*Carya*) in Georgia. A list of susceptible and resistant varieties is given but there seems to be great variation depending on locality.—Experiments indicate that the disease may be held in check by the use of bordeaux mixture, 3:3:50. The number and time of treatments depend on weather conditions. A treatment should be made as soon as the nuts are formed and in very rainy seasons additional treatments are required at intervals of two weeks.—D. Reddick.

787. STAHEL, GEROLD. *De sclerotium-ziekte van de Liberia-koffie in Suriname*. [The sclerotium disease of Liberian coffee in Suriname.] Meded. Dept. Landbouw Suriname 11: 2 p. 1918.—The disease was previously described from Suriname as the Coremium disease. Dark brown spots with distinct concentric rings are produced on the full-grown leaves. On the under side of the leaf coinciding with the darker rings are found numerous white fungus bristles, 2 to 1 mm. long. They bear no spores and are not coremia. They break off and are blown about by the wind and cause new infections. They also develop on diseased fruit which shows the same concentric marking. In damp situations small greenish brown or orange brown sclerotia are formed on the leaves and berries while still on the trees. A spore-bearing form could not be found. The mycelium has clamp connections. Disease can be controlled with Bordeaux mixture.—*C. robusta*, *C. uganda* and *C. arabica* are resistant while *C. abbreviata* and *C. excelsa* are susceptible.—J. B. Rorer.

788. STAHL, C. F., AND EUBANKS CARNSER. *Obtaining beet leafhoppers nonvirulent as to curly-top*. Jour. Agric. Res. 14: 393-394. 1918.—Young nymphs of *Eutettix tenella* in emerging from the egg force their way, anterior end first, through the tissue of the petioles and midribs in which the eggs are deposited. It is possible to brush off the emerging nymphs before they have had a chance to feed and tests show that such nymphs are not carriers of the virus of the curly-top disease of sugarbeet (*Beta vulgaris*).—D. Reddick.

789. STAKEMAN, E. C., F. J. PIEMEISEL, AND M. N. LEVINE. *Plasticity of biologic forms of Puccinia graminis*. Jour. Agric. Res. 15: 221-249. Pl. 17-18. 1918.—As a preliminary to

culture work it is necessary to isolate biologic forms from mixtures. How difficult this may be is illustrated in tables. If it is not done there is danger of erroneously concluding that bridging may have occurred.—Tests for four consecutive seasons with the forms *tritici*, *tritici-compacti*, *avenae* and *secalis*, show that biologic forms are neither broken down nor invigorated by passing through the barberry.—*Puccinia graminis secalis*, which does not attack wheat, but which does infect barley readily was cultured on barley and other theoretical bridging hosts continuously for three years during which time more than 2,000 wheat plants were inoculated. The rust acquired no new parasitic capability on account of its association with barley. Similar tests with other forms lead to the conclusion that "no one so-called bridging host nor any combination of such hosts enabled any biologic form tried to infect naturally immune plants nor to infect a highly resistant plant more readily." Many attempts to increase the virulence of biologic forms on resistant hosts by successive transfers to these hosts indicate that rust forms do not gradually adapt themselves to resistant or semicongenial hosts, i.e., biologic forms appear to be roughly analogous to pure lines. Possibly *P. graminis avenae* is a mixture from which pure lines can be isolated. Perceptible evolutionary changes have not been produced experimentally and no mutations have been observed. Practically this constancy of biologic forms is of importance in that breeding for rust resistance can proceed with considerable assurance that the same rust will not adapt itself quickly to new varieties.—D. Reddick.

790. SWINGLE, D. B., AND H. E. MORRIS. Plum pocket and leaf gall on Americana plums. Montana Agric. Exp. Sta. Bull. 123: 167-188. 6 fig. 1918. Plum-pocket caused by *Taphrina communis*, and leaf gall, caused by *Eriophyes pruni*, are described and illustrated. Their presence on the native wild plum (*P. americana*), the only species grown commercially in the State, has made plum growing unprofitable. Leaf curl, caused by *Taphrina decipiens*, occurs in the State but is not destructive. The former troubles may be controlled by a single application of lime-sulfur solution (1:50) made just before the fruit buds open. Leaf curl can not be controlled in this way.—D. Reddick.

791. TAUBENHAUS, J. J. Diseases of truck crops and their control. 20 x 14 cm. xxii + 596 p., E. P. Dutton & Co.: New York, 1918.

792. UZEL, H. Bericht über Krankheiten und Feinde der Zuckerrübe in Böhmen und der mit derselben abwechselnd kultivierten Pflanzen im Jahre 1916. [Diseases and enemies of sugar-beet in Bohemia and the cultivated plants rotated with it.] Zeitschr. Zuckerindust. Böhmen 42: 228-233. 1918.—Bee, nematode, dry root rot of young plants and "dauerwurzelbrand" were present. Dry root rot is controlled by the use of 4 per cent raw peroxid solution, treating for 6.5 hours. Heart rot often healed leaving only a hole in the top. [From abst. by O. von Kirchner in Zeitschr. Pflanzenkr. 28: 339. 1918.]—D. Reddick.

793. UZEL, H. Über die Beurteilung des Rübensamens vom phytopathologischen Standpunkte aus. [On the judging of beet seeds from the pathological standpoint.] Zeitschr. Zuckerindust. Böhmen 42: 364-370. 1918.—On the small leaves about the seed heads of beet mother plants the following were found: *Sporidesmium putrefaciens*, *Phoma betae*, *Cercospora heliicola*, and *Cladosporium herbarum*. Seed disinfection is advised only for seed from diseased crops. Four per cent solution of peroxid is the best disinfectant. [From abst. by O. von Kirchner in Zeitschr. Pflanzenkr. 28: 339-340. 1918.]—D. Reddick.

794. UZEL, H. Über Krankheiten und Schädiger der Samenrübe in Böhmen in den Jahren 1916 und 1917. [Diseases and enemies of seed beet in Bohemia in 1916 and 1917.] Zeitschr. Zuckerindust. Böhmen 42: 423-430. 1918.—Much damage done by field mice. Seed heads were shattered by birds looking for insects.—A rot of the tap root, a chronic root disease and heart rot were present. [From abst. by O. von Kirchner in Zeitschr. Pflanzenkr. 28: 339. 1918.]—D. Reddick.

795. VAN DER BIJL, PAUL A. A cane leaf spot. S. African Dept. Agric. Sci. Bull. 10: 1-15. 6 fig. 1918.—The disease is very similar in appearance to the eye-spot disease of Hawaii. Circular to oblong light-colored spots usually delimited by a dark brown ring appear on the leaf blades and midribs.—A fungus was isolated and inoculations on pieces of leaves in moist chambers resulted in typical lesions. The organism is closely related to if not identical with *Cereospora sacchari*.—The fungus grows well on various media producing spores of variable length (17.5 to 112 μ) and septation (3 to 12).—Any cell of a spore may germinate in water within an hour. Spores withstand desiccation at room temperatures as long as 32 days but not 49 days; they germinate at temperatures 11.6 to 37° whether placed directly in water or are first air dried for 17 hours.—D. Reddick.

796. VAN DER BIJL, PAUL A. Ring spot of cane leaves. S. African Dept. Agric. Sci. Bull. 10: 15-16. Fig. 7. 1918.—See Bot. Abstr. 3, Entry 377.

797. WAKEFIELD, E. M. A disease of the yam. (*Bagnisiopsis dioscoreae*.) Kew Bull. Misc. Inform. 1918: 199-201. Illust. 1918.—*Bagnisiopsis dioscoreae* on *Dioscorea prehensilis* from Nigeria is described as new. The fungus occurs on the branches and is "undoubtedly parasitic." The length of nodes and size of leaves on affected branches is reduced. There is no adventitious growth "although the swelling of the attacked haulms, together with the tiny rather chlorotic leaves, produces the appearance of a witches' broom." The yam vines attacked, are on poor or swampy places.—D. Reddick.

798. WESTON, JR., WM. H. Report on the plant disease situation in Guam. Rept. Guam Agric. Exp. Sta. 1917: 45-62. 1918.—List of diseases of economic plants found on the Island in March, 1918.—Conditions in Guam which favor the development of diseases are: moist, tropical climate; primitive agricultural practices; unregulated importations of plants.—D. Reddick.

799. WOLK, P. C. Het nieuwe gezichtspunt de serehziekte. [New viewpoint on "sereh."] Cultura 30: 302-306. 1918.

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

HENRY KRAEMER, Editor

800. ANONYMOUS. Mexico's little-known botanicals. Drug and Chem. Markets 5: 21. 1919.—General reference is made to the wealth in Mexico of natural products, little known outside the country. Specifically mentioned and very briefly discussed are the following: Cacahuanache (*Licania arborea* Seemé), yielding abundant seeds with over 60 per cent of fixed oil valuable in the manufacture of artificial rubber. Chia (*Salvia polistachys*) said to produce a drying oil used in industries. Mamey (*Lucuma mammosa*); the oil in the seeds or the seeds themselves are used as cosmetics. Mosquitos; the tree yields a gum similar to gum arabic and the leaves are used in an eye remedy. Panete (*Plumbago pulchella*) yielding a caustic substance similar in effect to iodine (plumbagin is probably referred to—Ref.) Tabaquillo Oloroso (*Hedeoma piperita*) yielding an abundant mint like ethereal oil with 50 per cent menthol. La Raiz del Ozo Bear root, Valerian of Mexico considered a satisfactory substitute for the European drug. Azafrancillo (*Carthamus tinctoria*) used as saffron substitute in cooking. Chavacano (*Prunus armeniaca*) used for flavoring and Aguacate (*Persea gratissima*) growing wild but not as yet utilized, are also included in the list. The place of growth is usually given.—Arno Viehoever.

801. HERRER, R. Sur la distillation sèche du bois de *Juniperus Oxycedrus* et de quelques confères. [On dry distillation of wood of Juniper, etc.] Jour. Pharm. Chim. VII, 19: 33, 65. 1919.—The author has continued his studies on the oils of *Juniperus Oxycedrus* (see Jour. Pharm. Chim. VII, 121. Nov. 1, 1915). In the present investigation he has undertaken to study the relationship between the volatile oil obtained from the unheated wood and the oil

of Cade derived on the destructive distillation of wood. For convenience, he designates the oil of Cade "V" and the volatile oil "F."—Several conclusions are drawn from his experimental work. (1) Concerning the oil of Cade. Besides the differences in the fractions on distillation for determining the authenticity of the oil of Cade, the determination of the iodine number of Hübl and saponification figures furnish useful data on the adulteration of the oil. (2) Concerning the oils obtained from the cedar wood. It is evident that between the two oils V and F which have been studied comparatively after being prepared from wood of the same origin some rather distinct differences could be recognized, but except in the nature of the product derived by the evaporation of the ethereal solutions, one cannot determine any essential differences between the oils. Furthermore, the differences in the iodine number are not so apparent as the behavior of the two oils on fractionating. Although there is a distinct difference yet there is a striking resemblance between this oil and that naturally obtained on destructive distillation. This is interesting as it has some bearing on the origin and formation of the oils from the elementary hydrocarbons under the influence of metabolism in the plant. (3) Comparing the oil of Cade with the empyreumatic products derived from other Coniferae, he says: The color reactions on products obtained either by steam distillation or heating the empyreumatic oils do not show sensible differences from that of oils obtained from rather diverse sources. The fractional distillate and evaluation of the tarry residue do not enable one to differentiate the oils of Cade and the oils of *Juniperus virginiana* and *Cedrus Libani*. Distinct differences, however, were noted in the iodine number in oils of Cade and *Cedrus Libani* which had been previously treated with soda. On the contrary, the volatile oil (F) and the oil of Cade (V) are practically identical with that of the oil of *Juniperus virginiana*.—H. Kraemer.

802. KAUFFMAN, C. H. The Agaricaceae of Michigan. Michigan Geol. Biol. Survey Pub. 26. (Biol. Ser. 5). 1918.—See Bot. Absts. 2, Entry 627.

803. MIRANDE. [Hydrocyanic acid in ferns.] Compt. Rend. Acad. Sci. Paris 167: 695. Nov. 4, 1918.—It is known that some plants containing hydrocyanic acid belong to the group of ferns; among others, *Pteris aquilina* Greshoff contains the glucoside amygdalin. Mirande proved the presence of a cyanogenetic glucoside (amygdalin) in the leaves of a fern rather common in the mountains of Savoy and Dauphiné, *Cyrtopteris alpina*. The leaves are macerated in water for several hours at a temperature of 25°–30°C. Subjected to steam distillation, the distillate contains hydrocyanic acid and benzoic aldehyde, the latter being detected by the formation of a hydrazone of this aldehyde under the action of acetic phenylhydrazine. The quantity of the glucoside, rather abundant at the beginning of the season, decreases little by little and reaches its minimum in September. The old leaves give a very faint odor of bitter almonds. This odor is also developed during dessication. H. Kraemer.

804. SCOVILLE, W. L. Scammony and its substitutes. Jour. Indust. Eng. Chem. 11: 325–326. 1919. Owing to the scarcity of jalap during the war, great interest was manifested in those drugs which would yield a similar active resin. [See Bot. Absts. 1, Entries 696, 699, 673.] This is a further study on this subject. A drug offered as *Resina dractrica* and coming from Mexico, seemed in a general way to resemble *Ipomoea orizabensis*, but chemical examination showed it to be very different. The resin amounted to 19.2 per cent and the alcoholic extractive was 23.5 per cent. In general, this resembles both true and Mexican scammony resins. It is slightly more acid and is more strongly levorotatory. Its color alone would distinguish it, and treatment with decolorizing charcoal does not take out the color appreciably. When freshly precipitated it has an agreeable tea-like odor which disappears on drying. Probably a small amount of volatile oil is present in the drug. The powdered resin resembles scammony resin in odor. The special distinguishing features of the three resins are (1) the brownish color of true scammony resin, and the very deep green color which it gives with iron salts, (2) the light color of Mexican scammony resin, producing a colorless alcoholic solution, and giving almost no color with iron salts, and (3) the deep lemon-yellow color of the *Resina dractrica* resin. The iron test distinguishes quite sharply between true and Mexican scammony

when a ferrous salt is used. If 0.5 g. of the resin be dissolved in 10 mls of alcohol and 0.5 ml. of a 10 per cent. aqueous solution of ferrous sulfate is added, the Mexican scammony resin shows only a very faint green while the others become dark green and on standing deposit a dark mass, leaving an olive-green supernatant liquid.—*H. Kraemer*.

PHYSIOLOGY

B. M. DUGGAR, *Editor*

PROTOPLASM, MOTILITY

805. HARDER, RICHARD. Über die Bewegung der Nostocaceen. [On the movement of the Nostocaceae.] Zeitschr. Bot. 10: 177-244. 1918.—Only when poorly nourished with organic material are hormogonia active. A young hormogonium at first creeps, without rolling in and out of the enveloping wall, later emerging in the direction of its long axis. After this, reversal usually occurs only under stimulation (mechanical obstruction or sudden change of darkness), which first produces a resting period of 1-2 minutes. Cells of a given hormogonium are independent in the secretion of mucilage (whose swelling the author thinks produces movement), in direction of movement, in time of reaction, and in perception of stimuli. This independent activity may break the hormogonia. The rate of movement varies with temperature, individuality, age, and light intensity. Tables and graphs show the magnitudes of these influences. The author presents a colloidal-swelling hypothesis to account for the mechanics of movement and its direction. The mechanism of reversal is unknown.—*H. E. Pulling*.

806. VONWILLER, PAUL. Über den Bau des Plasmas der niedersten Tiere. [On the structure of the plasma of the lower organisms.] Arch. Protistenk. 38: 279-323. 1918.—The article is devoted to cytological evidence on protoplasmic inclusions, vacuoles, crystals, sphaeroplasts, etc., and on the nature of the plasma membrane of rhizopods and myxomycetes, with special reference to the use and chemistry of vital stains.—*Wm. Seifriz*.

DIFFUSION, PERMEABILITY

807. OSTERHOUT, W. J. V. A comparative study on permeability in plants. Jour. Gen. Physiol. 1: 299-304. 1918.—Quantitative studies on *Laminaria* (a brown alga), *Ulva* (a green alga), *Rhodomenia* (a red alga), and *Zostera* (a flowering plant) show that the behavior of these plants in respect to changes in permeability are essentially alike in all cases.—*Henry Schmitz*.

WATER RELATIONS

808. PENGELLY, MARGARET. Demonstration of methods for the study of stomatal action. Rept. Michigan Acad. Sci. 20: 154. 1918.—The three methods shown and compared were (1) Darwin's porometer (Darwin and Pertz), (2) the hygrometric paper method (Livingston and Shreve), and (3) direct examination with the microscope (F. E. Lloyd). Since method 2 is indicative of transpiration activity, and as stomatal activity does not necessarily run parallel, it is not considered as valuable as either method 1 or 3. Method 3 is used as a check on method 2.—*R. P. Hibbard*.

MINERAL NUTRIENTS

809. APPEL, M. Über den Wert der von der Cronesechen Nährlösung. [On the value of Crone's nutrient solution.] Zeitschr. Bot. 10: 145-158. 1918.—Appel experimented with maize and buckwheat plants, growing them in Crone's and Pfeffer's nutrient solutions. He tested two forms of Crone's solution, one with tri-calcium phosphate and the other without it. The plants were harvested at the time of flowering and the length of the roots and shoots and that of the longest leaf were measured and dry weight was determined. Crone's solution

remained neutral during the growth period, or became slightly alkaline, and its content of ferrous salt remained almost unchanged. Pfeiffer's solution was acid at the beginning of the experiment, but during the development of the plants a precipitate was formed and the solution became neutral. The amount of ferric salt in Pfeiffer's solution (originally rather large) decreased and finally became nil during the growth of the plants. It was further found that plants that are but slightly sensitive to acid, such as buckwheat, thrive as well in Pfeiffer's as in Crone's solution. Iron-loving plants that are at the same time sensitive to acid, such as maize, develop better in Crone's solution.—*Raf. B. Espino*.

810. BUCKNER, G. DAVIS. The translocation of the mineral constituents of the Jack bean. *Jour. Amer. Chem. Soc.* 41: 282-287. 1919.

811. HIBBARD, R. P. Salt ratios in soil cultures. Rept. Michigan Acad. Sci. 20: 147-150. 1918.—When 3 salts KH_2PO_4 , $MgSO_4$, and $Ca(NO_3)_2$ are combined in all possible ratios each varying from the other by 10 per cent increments there are 36 possible ratios. By means of auto-irrigation 36 pots of soil were maintained at optimum water content, and each was supplied with a definite ratio of the 3 salts. The soil was thus treated to determine if possible a best or optimum ratio of salts for that particular soil. In previous studies it had been possible to determine an optimum ratio in both the soil solution and distilled water cultures. The optimum ratio for wheat in a sandy loam was 4:4:3. That for a poor sandy soil, also for wheat, was 5:4:1. This study suggests a possible laboratory method for determining the fertilizer needs of a soil in a quick, reliable, scientific manner, rather than depending on long time experiments and empirical methods.—*R. P. Hibbard*.

812. DAVIDSON, J., and J. A. LECLERC. The effect of sodium nitrate applied at different stages of growth on yield, composition and quality of wheat. 2. *Jour. Amer. Soc. Agron.* 10: 161, 198. 1918.—A continuation of previous studies which includes chemical analysis of the plants. No conclusive results were obtained on the effect of $NaNO_3$ on the ash, phosphoric acid, or potash content of the grain. Nitrate applied at the second stage of the plant growth increased the protein content of both grain and straw, while potassium chloride depressed the protein content of straw.—*H. S. Reed*.

813. DICKSON, JAMES G. The value of certain nutritive elements in the development of the oat plant. *Amer. Jour. Bot.* 5: 301-324. Fig. 1-5. 1918.—Using Knop's standard nutrient solution, slightly modified, the author studies the effect of certain nutritive elements on growth, total dry weight, grain production, and water requirement. A deficiency in phosphorus, nitrogen, magnesium, calcium, or potassium affects each phase studied; however, the effects upon the plants of limiting the supply of phosphorus or nitrogen are much more severe and noticeable than the effects of limiting the supply of magnesium, calcium, or potassium.—*R. W. Webb*.

814. GURLITT, LEOWIGA. Über der Einfluss der Konzentration der Nährlösung auf einige Pflanze. (The influence of nutrient salt concentration on certain plants.) *Beih. Bot. Centralbl.* 35: 279-341. 1918.—1. The effect of concentrations of Knop's solution, from 0.1 to 4 per cent, on the form of moss protonema was observed. *Funaria* protonema growing in the lower concentrations had long thin cells, little chlorophyll, and rich growth of rhizoids. Protonema growing in the higher concentrations had spherical cells. The chlorophyll content increased with the concentration. In 0.1 per cent solutions and upward there were no rhizoids.—2. *Chenopodium rubrum*, *C. album*, *Tradescantia fluminata*, *T. Zehnera*, *Rumex crispus*, and other plants were grown in Knop's solution of different concentrations up to 4 per cent. It was found that the osmotic pressure of the plant cells increased with increased pressure of the solutions. The osmotic pressure of the leaves was determined plasmolytically in cells over the midvein. *Tradescantia* leaves showed a constant difference of about 5 atmospheres between cell pressure and solution pressure. The pressure of *Rumex* leaves increased from 17 atmospheres (grown in water) to 37 atmospheres (in 4 per cent Knop's),—a difference between cell pressures and solution pressure of from 17 to 23 atmospheres.

Chenopodium leaves showed a greatly increased osmotic pressure in the higher concentrations of Knop's solution: in water 13 atmospheres, 0.5 per cent Knop's 18 atmospheres, 1 per cent solution 29 atmospheres, 1.5 per cent solution 33 atmospheres, 2 per cent solution 41 atmospheres, 2.5 per cent solution 43 atmospheres, 3 per cent solution 58 atmospheres, 4 per cent solution 64 atmospheres.—The osmotic pressure of the roots also increased with increased pressure of the solutions in which they were growing. It was always somewhat lower than the pressure of the leaves.—It was thought that the increased pressure was due in part to an accumulation of sugar in the cells because of slow growth in the higher concentrations.—*Sophia Eckerson.*

815. NORTHROP, ZAR. The effect of concentrated solutions of certain magnesium salts on pyogenic and other bacteria. Jour. Infect. Diseases 24: 170-175. 1919.—A saturated solution of $MgSO_4$ has no effect on *Staphylococcus aureus*; any concentration of $MgSO_4$ (5 per cent and more) will inhibit growth of *Streptococcus pyogenes*; a concentration of 30-45 per cent of $MgSO_4$ was required to prevent the growth of *Bacterium coli*. $MgCl_2$ had the most marked inhibitory action on the growth of all organisms used in the experiment. The Mg -ion itself is probably responsible for this action.—*Selman A. Waksman*

816. SHIVE, J. W., AND MARTIN, W. H. A comparative study of salt requirements by young and mature buckwheat plants in solution cultures. Jour. Agr. Res. 14: 151-175. 1919.—Young and mature buckwheat plants were grown on optimum three salt solutions. The salts, potassium phosphate, calcium nitrate, and magnesium sulfate were so distributed as to include all possible sets of proportions of the three salts when the partial concentrations of the three components were made to vary by equal increments of one tenth of the total osmotic concentration. Each solution contained a trace of iron as iron sulfate. The yield of roots and tops in the different solutions are given. No definite correlation between the yield of tops and of seeds, such as there is between the yield of tops and of roots, was found.—*Henry Schmitz.*

✓ 817. TOTTINGHAM, W. E. A preliminary study of the influence of chlorides on the growth of certain agricultural plants. Jour. Amer. Soc. Agron. 1: 1-33. 1918.—In many cases the plants responded to the influence of chlorides by an increase in the amounts of tops, leaves, and roots. Proceeding from the observed effects of chlorides upon diastase and other enzymes which act upon carbohydrates, a tentative hypothesis is advanced to explain the varied physiological responses of plants to chlorides through the regulation of enzyme activity by these salts.—*Henry Schmitz.*

PHOTOSYNTHESIS

818. OSTERHOUT, W. J. V., AND A. R. C. HAAS. On the dynamics of photosynthesis. Jour. Gen. Physiol. 1: 1-16. 1918.—Minute amounts of photosynthesis in marine plants can be accurately measured by adding a little phenolphthalein to sea water and observing the change in color of the indicator. In the case of fresh water aquatics bicarbonates are added. By this method it is found that *Ulex*, which has been kept in the dark, begins photosynthesis as soon as it is exposed to sunlight and that the rate steadily increases until a constant speed is attained. This fact is explained by assuming that sunlight decomposes a substance whose products either catalyze photosynthesis or enter directly into the reaction.—*Henry Schmitz.*

METABOLISM (GENERAL)

819. COHN, E. J., S. B. WOLBACH, L. J. HENDERSON, AND P. H. CATHCART. On the control of rope in bread. Jour. Gen. Physiol. 1: 221-230. 1918.—A bacillus belonging to the *Bacillus mesentericus* group is found to be the possible causative organism. It is believed that by maintaining a hydrogen-ion concentration of near 10^{-5} in the bread the reaction would be sufficiently acid to prevent the development of rope.—*Henry Schmitz.*

820. FELLEBERG, TH. VON. Über den Nachweis und die Bestimmung des Methylalkohols, sein Vorkommen in den verschiedenen Nahrungsmitteln und das Verhalten der methylalkoholhaltigen Nahrungsmittel im Organismus. [The presence and method of determination of methyl alcohol, and its origin in foods.] *Biochem. Zeitschr.* 85: 45-117. 1918.—Traces of methyl alcohol are found in many fruits, seeds, and plant tissues. The large amounts occurring in various fermented liquors is attributed to the decomposition of pectic substances.—*Henry Schmitz.*

821. KAPPEN, H. Untersuchungen über Wurzelsäften. [Investigations on root sap.] *Landw. Versuchst.* 91: 1-40. 1918.—Expressed root saps were studied using (1) wheat, (3) barley, (4) oats, (5) rye, (2) dwarf bean, (7) horse bean, (8) lupine, (6) mustard, (9) buckwheat. These names are arranged in order of increasing acidity determined by titration, and numbered in order of increasing H-ion concentration. Nos. 4, 5 and 2 are alike by titration. Since H-ion concentration is very low for a molecular concentration of acid, the author concludes that the sap contains a mixture of free organic acids and their salts with strong bases (as in animals), these salts reducing acid dissociation. He questions the value of soil digestion with weak acids, as 1-2 per cent citric acid—supposed to be equivalent in dissolving power (H-ion concentration) to average roots—since 1 per cent citric acid solution has "titration-acidity" 6 times, and H-ion concentration 1500 times that of buckwheat root sap, the most acid sap found. Also, reduced dissociation of weak acids by neutral salts formed during digestion of soils, Thomas meal, etc., leads to erroneous comparative conclusions. The author thinks the characteristic acidity of a given plant is optimal for the action of its enzymes, as is known in the case of animals, so that lime-sensitive plants (really sensitive to all strong bases) are so because of reduced dissociation of acids in the sap through the action of neutral salts of strong bases. The greater the initial H-ion concentration of the sap the greater the reduction, so that the most acid plants are the most sensitive to alkalinity.—*H. E. Pulling.*

822. KYLIN, H. Zur Kenntniss der wasserlöslichen Kohlenhydrate der Laubblätter. [The water-soluble carbohydrates of foliage leaves.] *Zeitschr. Physiol. Chem.* 101: 77-88. 1918.—The amounts of soluble monosaccharides, disaccharides and polysaccharides occurring in various leaves are given.—*Henry Schmitz.*

823. KYLIN, H. Weitere Beiträge zur Biochemie der Meeresalgen. [Biochemistry of marine algae.] *Zeitschr. Physiol. Chem.* 101: 236-247. 1918.—Mannite is present in most of the brown but absent in the red and green algae. Laminarin, a complex laevo-rotary sugar which upon hydrolysis is quantitatively converted into dextrose, is isolated from the brown algae.—*Henry Schmitz.*

824. RIGG, GEORGE B. Some energy relations of plants. *Science* 48: 125-132. 1918.

825. SMALL, JAMES CRAIG. Quantitative determination of soluble starch in the presence of starch and its hydrolytic cleavage products. *Jour. Amer. Chem. Soc.* 41: 107-112. 1919.

826. SMALL, JAMES CRAIG. A method for the preparation of soluble starch. *Jour. Amer. Chem. Soc.* 41: 113-120. 1919.

827. VOETGLIN, CARL, AND C. N. MYERS. Phosphorous as an indicator of the "vitamine" content of corn and wheat products. *U. S. Public Health Rept.* 33: 49-54. 1918.

828. VOETGLIN, CARL, G. C. LAKE, AND C. N. MYERS. The dietary deficiency of cereal foods with reference to their content in "antineuritic vitamine." *U. S. Public Health Rept.* 33: 647-666. 1918.

829. VOETGLIN, CARL, AND C. N. MYERS. The growth-promoting properties of foods derived from corn and wheat. *U. S. Public Health Rept.* 33: 843-858. 1918.

830. ZELLNER, J. Chemische Untersuchungen über Pflanzengallen. II. [Chemical investigations of plant galls.] *Zeitschr. Physiol. Chem.* 101: 255-261. 1918.—Considerable chemical differences are found between normal and gall tissue.—*Henry Schmitz.*

METABOLISM (NITROGEN RELATIONS)

831. HESSELMAN, HENRICK. Studier öfver salteterbildningen i naturliga jordmånar och dess betydelse i väteekologiskt åfseende. [Nitrate production in forest soils.] *Meddel. Statens Skogsförsöksanst.* 13-14: 297-528. 1916-17. [Received, 1918.]—Nitrification in many forest soils is as rapid as in cultivated fields. Many forest trees make greater growth in soils where nitrification is taking place than in soils where it does not. In soils in which nitrates are not found certain pines still make good growth and it is suggested that this may be due to the fact that they are able to absorb and utilize the ammonia found present in the humus.—*Henry Schmitz.*

METABOLISM (ENZYMES ACTION, FERMENTATION)

832. CRUESS, W. V. The fermentation organisms of California grapes. *Univ. California Publ., Agric. Sci.* 4: 1-66. Pl. 1-2. 1918.—A qualitative and quantitative study of the fermentation organisms occurring on California grapes.—*Henry Schmitz.*

833. EULER, HANS. Über die Darstellung von Kohlenhydratphosphorsäurester (Zymophosphat) durch lebende Hefe. [The formation of zymophosphate by living yeasts.] *Biochem. Zeitschr.* 86: 337-342. 1918.—Two groups of yeast are recognized with respect to their power to quantitatively convert inorganic phosphorus to zymophosphates. One of these groups has this power only when in the active living state, while the other still retains it in the presence of toluol.—*Henry Schmitz.*

834. HARVEY, E. N. Studies on bioluminescence. VII. Reversibility of the photogenetic reaction in *Cypridina*. *Jour. Gen. Physiol.* 1: 133-145. 1918.—At least three substances are concerned in light production: (1) luciferin, a body oxidizing with the production of light, dialyzable, and relatively resistant to heat, (2) luciferase, destroyed by boiling, non-dialyzable, and accelerating the oxidation of luciferin, and (3) photophycin probably acting by assisting the luciferin-luciferase reaction.—*Henry Schmitz.*

835. HARVEY, E. N. Studies on bioluminescence. IX. Chemical nature of *Cypridina* luciferin and *Cypridina* luciferase. *Jour. Gen. Physiol.* 1: 269-295. 1918.—Luciferin presents many characteristics in common with proteins but doubt of its protein nature is indicated by its peculiar solubilities and its resistance to digestion by proteases. Luciferase is considered an oxidizing enzyme in a class by itself—a group having the general chemical reactions of albumins.—*Henry Schmitz.*

836. JACOBY, M. Über Fermentbildung. [Enzyme formation.] *Biochem. Zeitschr.* 86: 329-336. 1918.—Urease is formed by *Bacillus coli* when leucine is furnished the organism. The general conclusion is reached that the various substances concerned in the synthesis of proteins are also concerned in the formation of enzymes. [See Bot. Absts. 2, Entry 200].—*Henry Schmitz.*

837. LEBERT, M. Action des sels neutres sur l'inversion due sucre par les acides. [The effect of neutral salts on the inversion of sugar by acids.] *Rév. Gén. Bot.* 30: 241-244. 1918.

838. MYERS, VICTOR C., AND ANNE G. DELLENBAUGH. Studies on the amylolytic activity of human saliva with a new method. *Proc. Soc. Exp. Biol. Med.* 16: 18-20. 1918.

839. WAKSMAN, S. A. Studies on the proteolytic activities of soil microorganisms with special reference to fungi. *Jour. Bact.* 5: 475-492. 1918.—The organisms were grown on Czapek's solution, and Czapek's solution in which peptone or casein was substituted for

sodium nitrate, and the relative amounts of ammonia and amino nitrogen present in the filtrate determined. A small amount of amino nitrogen and considerable ammonia accumulates in rapidly growing cultures of molds, while in slow growing cultures there is a comparatively large accumulation of amino nitrogen and little ammonia. The presence of available carbohydrates checks the accumulation of ammonia in the medium. — *Henry Schmitz.*

METABOLISM (RESPIRATION)

840. BROOKS, MATILDA M. Comparative studies in respiration. III. The effect of ether on the growth and respiration of *Bacillus subtilis*. Jour. Gen. Physiol. 1: 193-191. 1918. — In all of the concentrations of ether studied (from 0.037 to 7.3 per cent) there is an increase in the rate of respiration of *Bacillus subtilis* followed by a decrease. In 7.3 per cent ether in tap water there is an extraordinary increase in the output of carbon dioxide (amounting to fifty times the normal). This does not occur when 0.85 per cent sodium chloride is added, which indicates antagonism between the ether and the sodium chloride. Ether is found toxic in low and high concentrations but in the intermediate concentrations (1.1 to 3.65 per cent) there is a stimulation of growth. — *Henry Schmitz.*

841. GUSTAFSON, F. G. Comparative studies on respiration. II. The effect of anesthetics and other substances on the respiration of *Aspergillus niger*. Jour. Gen. Physiol. 1: 181-191. 1918. — The effects of anesthetics and other substances on the respiration of *Aspergillus niger* and *Penicillium* are studied. In concentrations which are high enough to produce any effect, formaldehyde, ether, and acetone cause an increase followed by a decrease in respiration. — *Henry Schmitz.*

842. IRWIN, MARIAN. Comparative studies on respiration. V. The effect of ether on the production of carbon dioxide by animals. Jour. Gen. Physiol. 1: 209-210. 1918. — In general ether causes a decrease in the production of carbon dioxide by animals followed by an increase. The difference between plants and animals is found in that with the latter the increase in carbon dioxide output is accompanied by irreversible changes leading to death, while this is not necessarily the case in plants. — *Henry Schmitz.*

843. OSTERHOUT, W. J. V. A method of studying respiration. Jour. Gen. Physiol. 1: 17-22. 1918. — An apparatus is described which makes it possible to measure rapidly and accurately small amounts of carbon dioxide given off by organisms of all kinds. The apparatus can also be used to measure photosynthesis. — *Henry Schmitz.*

844. OSTERHOUT, W. J. V. An indicator method of measuring the consumption of oxygen. Jour. Gen. Physiol. 1: 167-171. 1918. — The use of the blood of the horse shoe crab (*Limulus*) which turns blue when oxygen is absorbed and becomes colorless when reduced is suggested as an indicator method of measuring the consumption of oxygen in certain organisms. — *Henry Schmitz.*

845. OSTERHOUT, W. J. V. Comparative studies in respiration. I. Introduction. Jour. Gen. Physiol. 1: 171-179. 1918. — A series of investigations with improved quantitative methods has been commenced. The results of the first of these show that when anesthetics are employed in sufficient concentration to produce any result, plants show a rise in respiration followed by a fall. In the animals studied the rise (found in the higher concentrations only) was preceded by a temporary fall which was not entirely due to lowering of muscular activity or tonus. In lower concentrations the effect upon animals was merely a decrease in respiration. — *Henry Schmitz.*

846. THOMAS, HELEN S. Comparative studies in respiration. IV. The effect of ether on the respiration of wheat. Jour. Gen. Physiol. 1: 203-207. 1918. — An increase of respiration followed by a decrease is produced by a concentration of from 7.3 to 3.65 per cent ether on wheat. — *Henry Schmitz.*

ORGANISM AS A WHOLE

847. FELLERS, C. L. The effect of inoculation, fertilizer treatment and certain minerals on the yield, composition and nodule formation of soy beans. *Soil Science* 6: 81-119. Pl. 1-3. 1918.—Experimental methods are given in detail and the results show that the composition and the nodule formation of soy beans may be influenced by all factors mentioned in the title.—R. W. Webb.

848. FELLERS, C. R. Report on the examination of commercial cultures of legume-infecting bacteria. *Soil Science* 6: 53-67. 1918.—The purity and vitality of many commercial cultures were found to be good. Soy beans were less successfully inoculated than most other legumes. Soil or muck cultures proved to be excellent carriers of soil bacteria.—R. W. Webb.

849. GILLESPIE, LOUIS J., AND LEWIS A. HURST. Hydrogen-ion concentration—soil type—common potato scab. *Soil Science* 6: 219-236. Fig. 1-3. 1918.—Using colorimetric and electrometric methods the hydrogen-ion concentration of many soils was determined with the result that excellent correlation is established between hydrogen-ion concentration and occurrence of potato scab. Exponents below 5.2 are related to little or no scab, while higher exponents are generally indicative of scab prevalence. [See Bot. Abstrs. 1, Entry 1617.]—R. W. Webb.

850. NEWCOMBE, F. C. Behavior of plants in unventilated chambers. *Rept. Michigan Acad.* 20: 145-146. 1918.—In this study covering a period of three years and the employment of more than 2000 plants, there appeared no constant appreciable differences in the rate of growth, the dropping of leaves, and the falling over of the plants when control plants were compared with plants growing in unventilated chambers. All experiments were carried on in the dark because of the impossibility of keeping constant temperature in the light. As regard to responses to geotropism and heliotropism in moving and stagnant air, no differences could be determined in the time of response or in the angle of curvature. The plants were generally seedlings of field corn, pop-corn, wheat, buckwheat, radish, white mustard, cabbage, bean, pumpkin, garden pea, kidney bean, Windsor broad bean, white lupine and sweet pea. Plants were kept in the experimental condition usually for from four to ten days.—H. F. Hibbard.

851. NEWCOMBE, F. C., AND ETTA A. BOWERMAN. Behavior of plants in unventilated chambers. *Amer. Jour. Bot.* 5: 284-294. 1918.—Various plants growing in quiet and in moving air were studied, but observations and measurements showed very slight differences between the plants raised under the two conditions.—R. W. Webb.

852. NOYES, H. A., AND C. O. CROMER. Tests of commercial cultures for legume inoculation. *Soil Science* 6: 69-77. Pl. 1. 1918.—Soil and commercial cultures were equally efficient in inoculation, each giving 100 per cent. Increased quantities of soil do not increase the inoculations, whereas larger quantities of commercial cultures do. Fertilization with nitrate of soda tended to reduce the percentage of inoculations.—R. W. Webb.

853. PRINGSHEIM, ERNST G. Zur Physiologie endophytischer Cyanophyceen. [The physiology of endophytic Cyanophyceae.] *Arch. Protistenk.* 38: 127-130. 1918.—*Nostoc punctiforme* from *Cycas* and *Gunnera*, and also *Anabaena Azollae* from *Azolla*, can be made to reproduce outside of the host plant. They are capable of autotrophic nourishment in nutrient solutions such as are generally used for algae. Increased growth through consumption of organic substances was noticeable only in *Nostoc*, in which such consumption could, to a certain degree, replace carbon dioxide assimilation. Nitrogen fixation was not observed.—Wm. Seifriz.

854. YOUNG, R. T. The relation of rhythms and endomixis, their periodicity and synchronism in *Paramecium aurelia*. *Biol. Bull.* 35: 33-47. 1918.

GROWTH, DEVELOPMENT, REPRODUCTION

855. LEVIN, ISSAC, AND MICHAEL LEVINE. Malignancy of the crown gall and its analogy to animal cancer. *Proc. Soc. Exp. Biol. Med.* 16: 21-22. 1918. See Bot. Absts. 2, Entry 106.

856. MELLSTRÖM, GÖSTA. Skogsträdens frösättning år 1916. [Seed production of forest trees.] *Meddel. Statens Skogs-försöksanst.* 13-14: 167-168. 1916 17. [Received 1918.] - The general conclusion is reached that after an adverse winter forest trees produce few flowers and still fewer seeds.—*Henry Schmitz.*

GERMINATION, RENEWAL OF ACTIVITY

857. BRYAN, W. E. Hastening the germination of Bermuda grass seed by the sulfuric acid treatment. *Jour. Amer. Soc. Agron.* 10: 279-281. 1918. -A method is described for obtaining promptly a higher percentage of seed germination. Seeds were immersed in strong sulfuric acid for periods of 5 to 60 minutes, washed, and transferred to moist blotting paper. The best results followed an acid treatment for 10 minutes. —*H. S. Reed.*

REGENERATION

858. LOEB, J. The law controlling the quantity of regeneration in the stem of *Bryophyllum calycinum*. *Jour. Gen. Phys.* 1: 81-96. 1918. -A method is given which allows the measurement of the influence of the mass of a leaf upon the quantity of shoots regenerated in an isolated piece of stem. The results indicate that the mass of shoots regenerated at the apex of such a piece of stem increases under equal conditions and equal time with the mass of the leaf and is approximately proportional to the mass of the leaf. —*Henry Schmitz.*

859. LOEB, J. The physiological basis of morphological polarity in regeneration. *Jour. Gen. Physiol.* 1: 337-362. 1918. -1. The leaves of *Bryophyllum calycinum* exert an inhibitory influence on shoot formation. The inhibitory influence can be diminished or be made to disappear when the mass of leaf is reduced below a certain limit. The possibility that the inhibitory influence of the leaf upon shoot formation is due to inhibitory substances secreted by the leaf and carried by the sap from the leaf towards the base of the stem is suggested.—*Henry Schmitz.*

TEMPERATURE RELATIONS

860. BEHRE, ELLINOR H. An experimental study of acclimation to temperature in *Planaria dorotocephala*. *Marine Biol. Bull.* 35: 277-317. 1918.

861. BOVIE, W. T., AND ALICE KLEIN. Sensitization to heat due to exposure to light of short wave lengths. *Jour. Gen. Physiol.* 1: 331-336. 1918. -*Paramecia* which have been exposed to fluorite radiation are so highly sensitized to heat that they are unable to withstand even for sixty seconds, temperatures which are optimum for non-radiated plants. —*Henry Schmitz.*

862. HOSKINS, M. M. Further experiments on the effect of heat on the eggs of *Cumia*. *Marine Biol. Bull.* 35: 260-276. Pl. 1-2. 1918.

863. KOTILA, J. E. Frost injury of potato tubers. *Rept. Michigan Acad. Sci.* 20: 451-459. 1918.—This is a statement of the various forms of frost injury and the great money loss sustained, and an account of the experimental production of various spottings and internal discolorations of tubers under control conditions. —*R. P. Hubbard.*

864. LAUGHLIN, H. H. The dynamics of cell-division. *Proc. Soc. Exp. Biol. Med.* 15: 117-122. 1918.—Study of dynamics of mitosis has lagged behind that of structural phases. Time relations of mitosis must be studied under different environments. A study is reported

the object of which was to determine the effect of increase in temperature of 10° above 10°C . and above 20°C . respectively on mitosis in onion root tips. The temperature coefficient, or Q_{10} , for the entire cell cycle in the two cases, respectively, is found to be $+1.2139$ and $+2.6218$. The increase from 10°C . to 20°C . thus only accelerates mitosis slightly, whereas an increase from 20°C . to 30°C . more than doubles the speed of cell division. The author lists 20 physical, chemical and physiological processes which increase in speed with rise in temperature between 5°C . and 35°C ., 10 which decrease, and 6 which may do either according to conditions. He concludes that mitosis is not the sum total of continuous and independent physiological actions, but an interrelated system of vastly complex forces.—*C. H. Farr*.

865. ORTERHOUT, W. J. V., AND A. R. C. HAAS. The temperature coefficient of photosynthesis. *Jour. Gen. Physiol.* 1: 295-298. 1918.—The temperature coefficient of photosynthesis in *Ulva* (between 17 and 27°C .) is 1.81. This may be explained by assuming that the process involves a light reaction with a low coefficient followed by an ordinary reaction with a high coefficient.—*Henry Schmitz*.

RADIANT ENERGY RELATIONS

866. BOYIE, W. T., AND D. M. HUGHES. Rate of recovery from the action of fluorite rays. *Jour. Gen. Physiol.* 1: 323-329. 1918.—Some experiments on the rate of recovery of *Paramecium caudatum* from the cytolytic action of fluorite rays are reported.—*Henry Schmitz*.

867. BROOKS, S. C. Complement destruction as a measure of the effects of radiation. *Jour. Med. Res. N. S.* 33: 345-351. 1918.—Attempting to secure indications regarding the initial changes produced in protoplasm by exposure to light the author employed a 2 per cent solution of guinea pig serum in .85 per cent sodium chloride, exposing the complement in a layer 11 mm. deep in a quartz tube 8.5 cm. from a mercury vapor arc. The complementing power was estimated by the hemolysis of sheep erythrocytes sensitized with several units of anti-sheep rabbit serum, and the grade of hemolysis ultimately measured colorimetrically. The results indicate a loss of complementing power, after radiating ten minutes, and no spontaneous recovery occurs.—*B. M. Duggar*.

868. HECHT, SELIG. The photic sensibility of *Ciona intestinalis*. *Jour. Gen. Physiol.* 1: 147-166. 1918.—The results obtained with regularly repeated stimulation not only fail to show any basis for a "learning" process, or for the presence of a "higher behavior," but follow the requirements of a photochemical reaction.—*Henry Schmitz*.

TOXIC AGENTS

869. BROOKS, S. C. A theory of the mechanism of disinfection, hemolysis, and similar processes. *Jour. Gen. Physiol.* 1: 61-80. 1918.—The various theories are discussed and found inadequate, and another is suggested. It is held that the course of processes like disinfection is the result of two factors; the frequency curve of variation in individual resistance, which may be different for each group of cells and each toxic agent; and the course of the fundamental reaction, which usually proceeds with a velocity diminishing during the experiment at a rate dependent on the particular conditions prevailing.—*Henry Schmitz*.

870. COOK, F. C., AND J. B. WILSON. Boron: Its effect^o on crops and its distribution in plants and soils in different parts of the United States. *Jour. Agric. Res.* 13: 451-470. 1918.—Borax or colemanite mixed with horse manure had no effect on the growth or yield of wheat or barley. A decided difference is found in the capacity of soils to render boron nontoxic to plants.—*Henry Schmitz*.

871. GOODSPEED, T. H., J. M. MCGEE, AND R. W. HODGSON. Note on the effects of illuminating gas and its constituents in causing abscission of flowers in *Nicotiana* and *Citrus*. *Univ. California Publ. Bot.* 5: 439-450. 1918.—Illuminating gas causes premature abscission, though the response may vary according to variety or species. The constituents of the gas, carbon-monoxide, carbon dioxide, and ethylene, all exert the same effect.—*R. W. Webb*.

872. HARRIS, F. S., AND D. W. PITTMAN. Soil factors affecting the toxicity of alkali. Jour. Agric. Res. 13: 287-319. 1918.—The size of particles of sand, independent of other factors seems appreciably to influence the toxicity of alkali. Coarse loams, however, are more tolerant than the finer ones at the same moisture content. In general, soils with high water-holding capacity are more tolerant to alkali than those having a low water-holding capacity.—*Henry Schmitz.*

873. MACHT, D. I., AND D. E. NELSON. On the antiseptic action of benzyl alcohol. Proc. Soc. Exp. Biol. Med. 16: 25-26. 1918.

874. PACKARD, C. Difference in the action of radium on green plants in the presence and absence of light. Jour. Gen. Physiol. 1: 37-38. 1918.—The effect of radium in causing the disintegration of *Spirogyra* and *Volvox* cells is much more pronounced in the dark than when the plants are exposed to light.—*Henry Schmitz.*

875. PACKARD, CHARLES. The effect of radium radiations on the development of *Chaetoporus*. Marine Biol. Bull. 35: 50-70. Pl. 1-2. 1918.

876. STEINBERG, R. A. A study of some factors influencing the stimulative action of zinc sulfate on the growth of *Aspergillus niger*. II. A comparison of two strains of the fungus. Bull. Torrey Bot. Club. 46: 1-21. Pl. 1. 1919.—The discrepancies existing between the results reported by various investigators for the stimulative action of zinc sulphate on the growth of *Aspergillus niger* are too great to be laid to experimental errors. Two one-spore strains of this fungus were isolated, one showing no pigment and the other the maximum amount of yellow pigment in the hyphae; the former was called W, and the latter Y. The existence of quantitative difference in the growth of the two strains was marked from the first, both with and without zinc, and it was demonstrated that a higher concentration of zinc was necessary to obtain the maximum yield for the W strain than for the Y. Both strains showed in time a decrease in the effect of the action of suboptimal zinc concentrations. The progressive modification of the growth capacity was scarcely manifest in the higher zinc concentrations. The assumption was made that this gradual change in the strains was due to the "non-addition of organic salts to the peptone-sucrose agar used for the stock cultures." Transfers were made to an agar medium containing such salts and cultured for three generations, then used for inoculating bread cultures and these in turn for Pfeffer solution. No modification of the two strains was evident in so far as the yield obtained was concerned. Experiments with various media seemed to show that the assumption that the decrease in yield was due to the impoverishing of the spores in some essential ash constituent was improbable. Throughout, however, the maximum yield of about 1 gram per 50 cc. of medium was obtained when the proper amount of zinc was added. The fact that the decrease in yield was most conspicuous when little or no zinc was added suggested that the "zinc-free" media were not entirely so. It seems that the differences existing in the literature between the results recorded by different investigators can, in part at least, be attributed to the use of strains having different "zinc optima."—*P. A. Manc.*

MISCELLANEOUS

877. LOEB, JACQUES. The influence of neutral salts upon the viscosity of gelatin solutions. Jour. Biol. Chem. 34: 395-413. 1918.

878. LOEB, J. Amphoteric colloids. I. Chemical influence of hydrogen ion concentration. Jour. Gen. Physiol. 1: 39-60. 1918.—The experiments suggest that the theory of amphoteric colloids in its general features is identical with the theory of inorganic hydroxides whose behavior is adequately understood on the basis of the laws of general chemistry.—*Henry Schmitz.*

879. LOEB, J. Amphoteric colloids. II. Volumetric analysis of ion-protein compounds; the significance of the isoelectric point for the purification of amphoteric colloids. Jour. Gen. Physiol. 1: 237-254. 1918.—It is shown by volumetric analysis that on the alkaline side from the isoelectric point gelatine combines with cations only, that on the more acid side from its isoelectric point it combines with anions, but not with cations, and at the isoelectric point (P. h. 4.7.) it combines with neither anion nor cation. It is suggested that the simplest method of obtaining amphoteric colloids approximately free from inorganic impurities would seem to consist of bringing them to the hydrogen ion concentration characteristic of their isoelectric point.—Henry Schmitz.

880. LOEB, J. Amphoteric colloids. III. Chemical basis of the influence of acid upon the physical properties of gelatin. Jour. Gen. Physiol. 1: 363-385. 1919.—The influence of acid upon the physical properties of gelatin is based on the fact that gelatin is an amphoteric electrolyte, which at its isoelectric point is but sparingly soluble in water, while its transformation into a salt with a univalent anion like bromine makes it soluble.—Henry Schmitz.

881. MACMILLAN, H. G. Sunscald of beans. Jour. Agric. Res. 13: 647-650. Pl. 64 etc. 1918.

882. WATSON, E. E. Relation between habitat and structure in *Pteris aquilina*. Rept. Michigan Acad. Sci. 20: 246. 1918.—Microscopical examination of sections of frond, petiole, and rhizome of plants from diverse habitats reveal structural differences as to cell size and number of stomata in the leaf and as to amount of interfascicular mechanical tissue in the petiole. There are no observable structural differences in the rhizome. [See Bot. Absts. 2, Entry 739.]—R. P. Hibbard.

883. KITCHEN, P. C. The relation between the structures of some coniferous woods and their penetration by preservatives. Rept. Michigan Acad. Sci. 20: 203-221. Pl. 11-12. 1918.—*Larix laricina* and *Larix occidentalis* are very similar in most of their characters and why the former is more difficultly penetrable to creosote oil was not understood until a microscopical examination of the structures most concerned in the passage of the oil was made. The seeming paradox in penetration, upon close examination of the bordered pit structures, is explained by a difference in "penetrable bordered pit areas." [See Bot. Absts. 2, Entry 746.]—R. P. Hibbard.

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, Editor

884. DE CANDOLLE, CASIMIR. Piperaceae a Jaheri in insulis Key collectae. [Piperaceae collected by Jaheri on the Key Islands.] Meded. van's Rijks Herb. Leiden. No. 32: 1-2. 1918.—Five species are recorded of which the following are new to science: *Piper subrepentatum*, *P. oblongibracteum*, and *P. keyanum*.—J. M. Greenman.

885. HALLIER, HANS. Ueber Aublet's Gattungen unsicherer oder unbekannter Stellung und über pflanzengeschichtliche Beziehungen zwischen Amerika und Afrika. [On the position of doubtful or unknown genera of Aublet and on the plant-historical relations between America and Africa.] Meded. van's Rijks Herb. Leiden No. 35: 1-33. 1918.—The author discusses in some detail about fifteen genera which were published by Aublet in the "Histoire des plantes de la Guiane françoise" in 1775. The position of these genera in the natural system of classification has remained for many years in doubt. According to Hallier *Pacouria* Aubl. = *Landolphia* Beauv., *Sagonea* Aubl. = *Hydrolea* L., *Guapira* Aubl. = *Pisonia* L., *Litorea* Aubl. = *Ocotea* Aubl., *Mananga* Aubl. = *Salacia* L., *Senapea* Aubl. = *Passiflora* L., *Voyara* Aubl. = *Capparis* L., *Courimari* Aubl. = *Sloanea* L., and *Tampoa* Aubl. = *Salacia* L.—J. M. Greenman.

586. HALLIER, HANS. Ueber Patrick Browne's Gattungen zweifelhafter Stellung. [On Patrick Browne's genera of doubtful position.] Meded. van's Rijks Herb. Leiden No. 36: 1-6. 1918.—Certain genera published by Patrick Browne in "History of Jamaica," 1756, are discussed. According to Hallier *Catonia* P. Br. = *Miconia* Ruiz & Pav., *Collocowea* P. Br. = *Cordia* L., *Chloroxylum* P. Br. = *Zizyphus* Adans., *Ateramnus* P. Br. = *Hippomane* L., and "Yimen" P. Br. = *Hyperbaena* Miers.—J. M. Greenman.

587. HALLIER, HANS. Die botanischen Ergebnisse der Elbert'schen Sunda-Expedition des Frankfurter Vereins für geographie und Statistik, III. [The botanical results of the Elbert Sunda-Expedition of the Frankfurt Society for Geography and Statistics.] Meded. van's Rijks Herb. Leiden No. 37: 1-92. 1918.—The present article contains not only a report on the plants collected by Elbert in the Dutch East Indies, but it includes descriptions of new species from allied floral regions and notes on the geographical distribution of species of wide occurrence in the tropics. The following new species and new combinations are included: *Artibe apoensis*, *A. khasiana*, *Daphniphyllum buchananifolium*, *D. papuanum*, *Racklandia tricuspidata*, (*Liquidambar tricuspidata* Miq.), *Burus nitidus* (*Austroburus nitidus* Miq.), *Graciosa grandiflora*, *G. quaternifolia*, *G. subternata*, *G. homocophylla*, *G. serrulata*, *G. antiochylla*, *G. cinamomea*, *Vitex padangensis*, *V. Cufassus* Reinw. var. *timorensis*, *V. Cufassus* Reinw. subvar. *pubescens*, *V. leptobotrys*, *V. secundiflora*, *V. flabelliflora*, *V. lasiantha*, *V. subspicata*, *V. tetragona*, *Mastixia prennoides* (*Vitex prennoides* Elm.), *Gmelina glandulosa*, *Clatodendrum viscosum* Vent. var. *nilagirica*, *C. confusum*, *C. adenophyllum*, *C. catalpifolium*, *C. brunsfelsiflorum*, *C. haematolasiun*, *C. macrophyllum* Bl. var. *sinuatifolium*, *C. barbatifolius*, *C. Huetii*, *C. Elbertii*, *Petreovitex ternata*, *Sphenodesme Winkleri*, and *Ardisia Rumphiana* J. M. Greenman.

588. HENRARD, J. TH., AND A. TRELLUNG. *Lepidium flavum* Torrey var. *apterum* nob. Meded. van's Rijks Herb. Leiden No. 34: 1-2. 1 text fig. 1918. *Lepidium flavum* Torr. var. *apterum* is described as a new variety from San Bernardino County, California. J. M. Greenman.

589. [HERZOG, TH.] Die von Dr. Th. Herzog auf seiner zweiten Reise durch Bolivien in den Jahren 1910 und 1911 gesammelten Pflanzen. Teil IV. [The plants collected by Dr. Th. Herzog on his second journey through Bolivia in the years 1910 and 1911. Part IV.] Meded. van's Rijks Herb. Leiden No. 33: 1-19. 1918. This article consists primarily of a reprint from Engler's Bot. Jahrb. 54: Beiblatt No. 118, of Krause's contribution on the Loranthaceae and Gilg's contribution on the Gentianaceae. J. M. Greenman.

590. KOIDZUMI, R. A new species of Cherry tree. Bot. Mag. Tōkyō 32: 54. 1918. Koidzumi describes the following species as new to science: *Prunus Cusuma*. T. Matsumoto.

591. MATSUDA, SADAHISA. Notes on *Rehmannia* found in China, Manchuria, and Korea. [Article in Japanese.] Bot. Mag. Tōkyō 32: 140-142. 1918. Five species and a few varieties are reported of which one variety is described as new to science. This variety was first described by T. Makino as new to science in "Zotei Sonoku Zassetsu," Vol. III, 861, but no name was given by him. Matsuda proposes the name of *R. glutinea* Libosch. var. *Makinoi*. T. Matsumoto.

592. NAKAI, TAKENOSHIN. Notes on wild cinnamon tree found in Ogasawara, Japan. [Article in Japanese.] Bot. Mag. Tōkyō 32: 178. 1918. The author states that *Cinnamomum pseudopedaunculatum* Hayata is identical with *C. Laureiri* var. *scrobiculatum* Meisn. and proposes the name of *C. scrobiculatum* (Meisn.) Nakai for this species. T. Matsumoto.

593. SWINGLE, WALTER T. *Merrillia*, a new Rutaceous genus of the tribe Citreae from the Malay Peninsula. Philippine Jour. Sci. Bot. 13: 335-343. Pl. 5-6. 1918. *Merrillia*, a new genus of the Rutaceae, is described and illustrated. The genus is based on *Murraya calazylon* Ridley and is native in southern Siam.—J. M. Greenman.

